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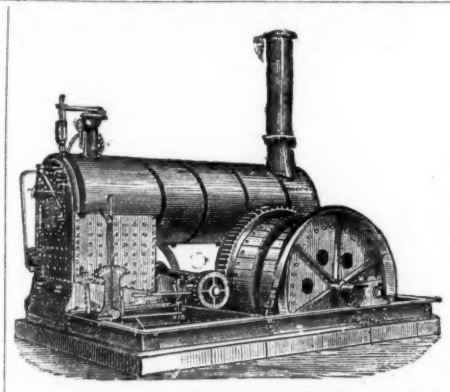

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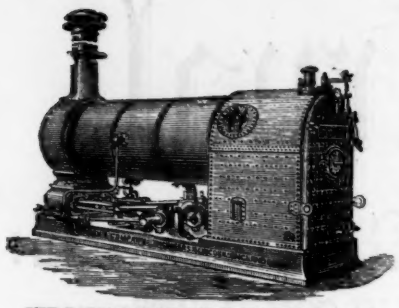

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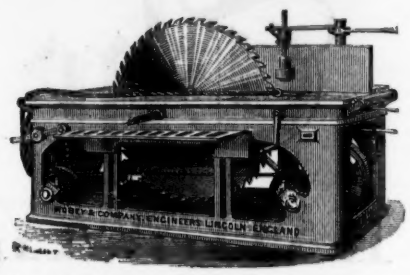

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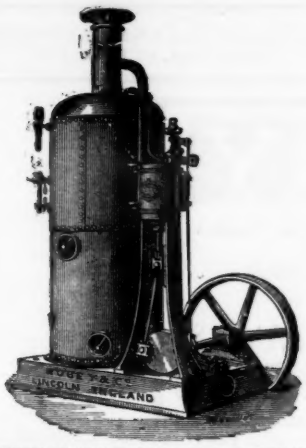

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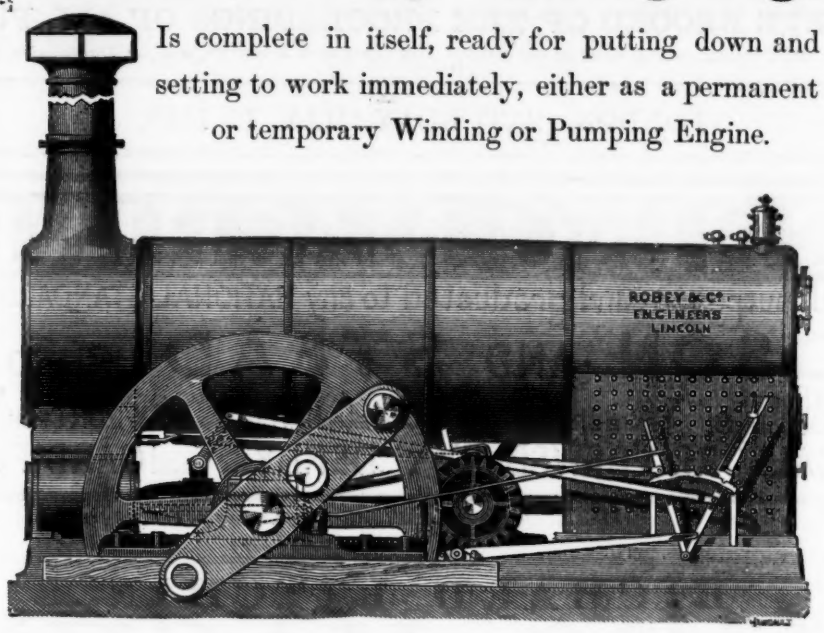

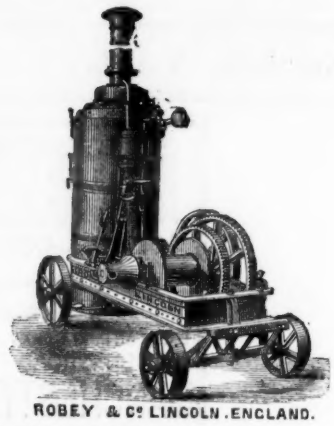

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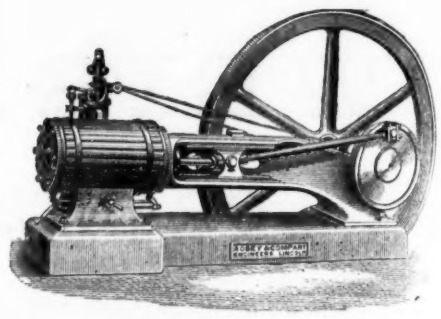

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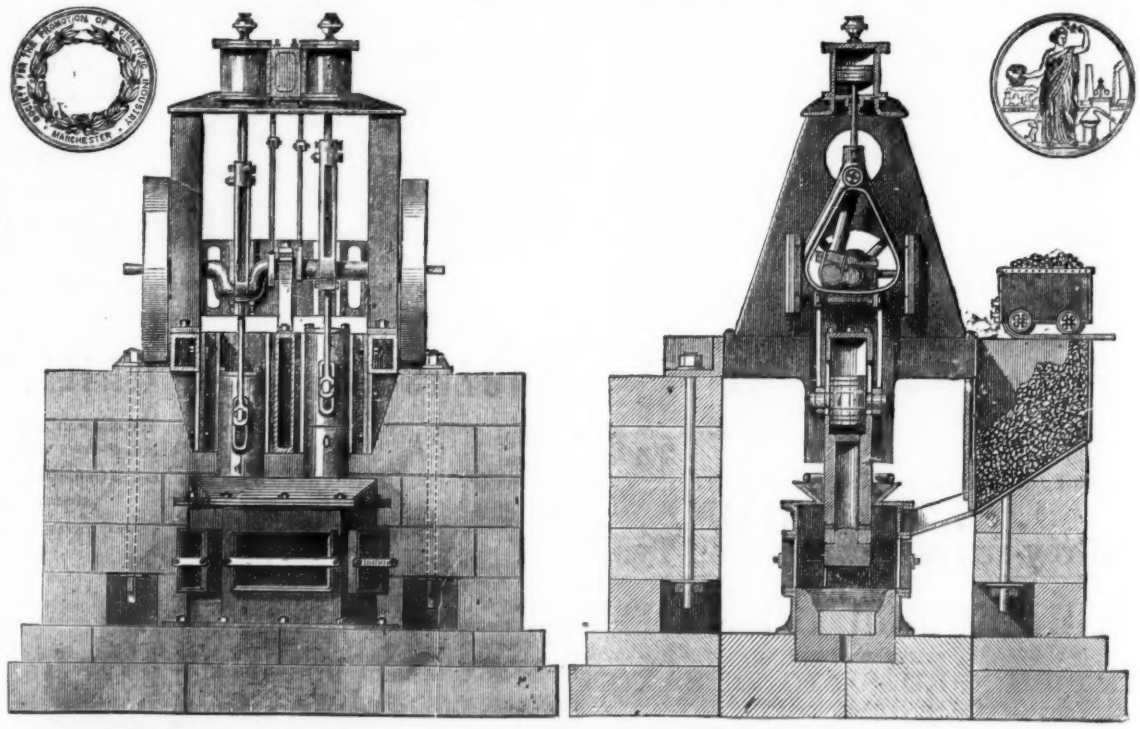

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THE BRITISH IRON TRADE.

The annual report—that for 1879—to the members of the British Iron Trade Association, just issued, contains an enormous amount of information, and what is still more important, shows that the position and prospects of the trade are by no means unsatisfactory. As the particulars given are judiciously classified according as they relate to the production and imports of iron ores, the pig-iron trade, the manufactured iron trade, the Bessemer steel trade, the open hearth steel trade, British exports and imports of iron and steel, the coal trade, the shipbuilding trade, railways and the iron trade, the foreign iron and coal trades, or foreign tariffs and the British iron trade, the utmost possible facility for reference is afforded. It is estimated that the output of iron ore in the United Kingdom during 1879 was about 10,000,000 tons less than that of the preceding year, the output of the Cleveland mines alone having fallen from 5,605,639 to 4,750,000 tons as ascertained by the Cleveland Mineowners' Association. It is probable that Cleveland shows an exceptional decline, due to the serious strike of coal miners in the spring of 1879, and to the generally depressed condition of the trade during the remainder of the summer. On the West Coast the production if it has declined at all has certainly not done so to any great extent.

The ascertained larger make of steel in 1879 warrants the belief that the ores of Cumberland and Lancashire, so largely used in the manufacture of hematite iron, have not given way in quantity during that year, and the fact is further confirmed by the decline in our imports of ore, amounting as it does to not less than 93,000 tons in the previous year. During the past decade the total production of ore in this country has been remarkably uniform. From 1871 the quantity raised has not varied more than 6 per cent.; it was greatest in 1876, and no year since 1871 shows a decrease of more than 6 per cent. from the maximum then reached. Yet it is a well-known fact that the production of pig-iron has varied considerably during these years, and the margin of variation between the production of ore in this country and the production of cast-iron is represented by our imports of ore. The statistics of these imports during the last ten years may be said to form a new chapter in the history of our iron trade. Since 1870 our imports have increased nearly 500 per cent., and they have been greatest during the last three years of commercial depression. In 1870 we imported some 200,000 tons of ore; in 1878 the quantity was nearly 1,200,000. In the latter year our imported ores formed 7 per cent. of the total quantity used in the United Kingdom. It is generally understood that these ores are of a quality suitable for conversion into steel. It is noteworthy that at the time when steel as well as iron reached the lowest price on record within the present generation we imported nearly 50 per cent. more of these ores than we did in the period of highest prices, 1871-74, and that, too, while the districts in this country possessing the finest ores were far from being really prosperous. Our chief supplies of imported ore come from Spain, whence 1,088,862 tons of the 1,173,860 tons imported in 1878 were derived, being exactly double the quantity imported from that country in 1876. Italy comes after Spain as a contributor of the raw materials required in the manufacture of steel. Until 1870 we imported no ores from Italian sources. In that year, however, we began with a lot of 119 tons, and thence the annual importation rapidly increased, until in 1877 it had attained the considerable proportion of 86,301 tons, mostly from the Island of Elba. Next comes Algeria, whence during the past 13 years we have imported 323,134 tons, of the declared Customs value of 396,174*l.*, showing that the Algerian ores cost the ironmasters over 1*l.* per ton. The ores of Algeria vary considerably in kind and composition. The Mokta Company raise from their mines at Kharehas a magnetic ore containing from 78 to 84 per cent. of peroxide of iron, while at Soumah, near Bonfarik, several varieties of hematite are raised containing 64 per cent. metallic iron, A third description of ore is raised from the Oued-bon-Chemla, containing 40 to 48 per cent. of metal. From Norway, as from Sweden, the imports of iron ore have been declining for several years. The latter country, indeed, has sent us no ores since 1874, and since that year, also, the imports from Norway have declined from 28,680 to 1023 tons. The whole of our imports from Sweden since 1866 are under 9000 tons, nor is their smallness to be wondered at in view of their excessive cost, which is greater than those of any other country except Russia, and amounts on the average to nearly 40s. per ton. Russia and Turkey still send us small supplies of ore varying from 4000 to 18,000 tons per annum. The only other country sending any important quantity of iron ore is Portugal, which supplied 48,277 tons in 1875, but the figures have been since decreasing. Hence appears the fact that the total imports of ore into the United Kingdom during the period of 13 years for which our figures have been compiled reaches 6,652,015 tons, or less than one-half the total annual production of Great Britain. The imported ores, however, are, as might be anticipated, much more costly than those of native origin, averaging over 25s. per ton from first to last, while English ores, according to the Mineral Statistics, do not exceed an average of about 8s. per ton. Of all iron ore producing countries England exports the least, usually from 2000 to 5000 tons, but it is said that 300,000 tons were sent to the United States in 1879.

During the first eight months of 1879 prices of pig-iron continued to fall and production to decline in most of the principal iron-making districts. In August, however, a current of demand set in chiefly from the United States, whither iron was shipped in considerable quantities. Concurrently with this a slight revival of confidence and of commercial enterprise became manifest throughout the principal countries of Europe, and the American demand still increasing, the improvement was not only continuously maintained until the end of the year, but gathered strength and volume in a degree that probably exceeded the expectations of the most sanguine. Within 13 years the world's production of pig-iron has advanced from 4,488,000 to 14,693,000 tons, the latter, which is the maximum production, having been reached in 1873. Since then the output has declined to 13,865,000 tons in 1878. The condition of the manufactured iron trade throughout the whole of 1879 has been exceptionally depressed. Both production and prices have largely declined; this remark applies equally to every district in the United Kingdom, none being exempted from the depression that had succeeded, after continuing for several years with increasing severity, in reducing this once flourishing branch of the trade to a shadow of its former self. The most considerable falling off shown in the North of England is that of 60,000 tons in the production of plates, although in angles the decline relative to the total is not less serious. In these two items together the falling off is equal, in round numbers, to 100,000 tons, a circumstance that bespeaks the greater dulness of the shipbuilding trade during the past year. It may, perhaps, be well to bear in mind that in comparing 1879 with the immediately preceding year we are instituting a comparison with the most prosperous year in the whole series so far as regards the tonnage of shipbuilding iron turned out of the mills of the North of England, and that while the production of plates during 1879 was less than that of 1878, it was really higher than that of any previous year, with the exception only of 1877. From an interesting statement compiled by Mr. William Whitwell, it appears that in October, 1879, there were 2158 puddling furnaces constructed in the North of England. Of that number only 838 were working, while of the remainder 821 belonged to firms that had failed, and 499 were idle because of the depression of trade. These 2158 furnaces were capable of producing 21,580 tons of puddled iron weekly, or upwards of 1,000,000 tons per annum. Custom House sources furnish shipments of merchant iron, and disclose the gratifying fact that during 1879 we sent away fully 13,000 tons more than in 1878. Eleven ports show an increase in their shipments for 1879 while four have declined. The most notable increase has occurred in the case of Hull, which has shipped 8237 tons more than in 1878, while the greatest decline, 2676 tons, appears at Swansea.

Again, the Bessemer steel production of the United Kingdom has made a substantial advance notwithstanding the extremely low and unprofitable rates that prevailed over the first nine months of 1879. Returns made to the British Iron Trade Association by the whole of the Bessemer steelworks in the kingdom, without exception, show that the aggregate production of ingots during 1879 was 834,511 tons, being an increase of 16,986 tons on the yield of the previous year. In the production of Bessemer steel rails, however, there has been a very remarkable decline, the aggregate for 1879 being only 519,718 tons, or roundly 114,000 tons under the quantity manufactured in 1878. This falling off is all the more remarkable when viewed in connection with the fact that the exports of steel rails during 1879 exceeded by 76,934 tons those of the previous year. A few figures will indicate the extent to which some leading firms have produced steel other than rails. One company, with a total yield of 109,463 tons of ingots, only manufactured 44,527 tons of rails; another, producing 90,892 tons of ingots, only worked up 58,723 tons into rails; while a third firm, returning 50,418 tons of ingots, only produced 19,368 tons of rails. The question is naturally suggested—What has become of the 314,140 tons of steel that represent the difference between the ingots and the rails produced during the past year? Very little of it has been applied to ship plates, which, next to railway purposes, call for the largest consumption of iron and steel. The Association has ascertained that the total quantity of shipplates made from Bessemer steel during 1879 was only 9151 tons, and that of the 23 firms engaged in the trade only 5 have turned out steel in this form. But a large, although uncertain, residue has been resolved into the form of billets, &c., and thus disposed of to forgemasters and others, while a still further quantity has been exported in the crude state to the United States and elsewhere. The Bessemer steel trade of the United Kingdom is now carried on in five districts—Sheffield, South Wales, Lancashire, Cumberland, and the North-Eastern or Cleveland district. A few thousand tons are also produced in Staffordshire. Scotland, where Bessemer steelworks are still standing, has for several years practically ceased to manufacture that article.

Several calculations have been made of the production of Bessemer steel throughout the world, and the means available for such a purpose are tolerably complete. No attempt, however, has yet been made to show the production relative to the number of converters employed. This we have endeavoured to do in the annexed statement, our returns having in each case been obtained from official sources, except as regards Austro-Hungary, where we have estimated the number of converters at work in 1877, while the production for that year is taken from Pechar's work. Sweden and Russia have been omitted, the former because we have no means even of estimating how many of the 38 converters belonging to that country were employed during any recent year, and the latter because the total production, representing less than 12,000 tons, is inconsiderable, being, indeed, under that of the average of each of the converters at work in the six countries included in our table. Our figures show that the most productive converters are those of the United States, where an average of 36,988 tons has been got by each. France follows with 12,821 tons per converter, and Great Britain makes a good third with 12,272 tons. To the total of 2,356,180 tons we require to add 23,000 for Sweden, and 11,000 for Russia, which brings up the whole production of Bessemer steel throughout the world to 2,390,180 tons.

The open hearth steel trade, now an important branch, is being developed with increasing activity, not in Great Britain only but abroad as well. Besides the extensive independent applications of the open hearth process for the production of high class steel it has, indeed, almost come to be regarded as a necessary, or at all events a highly convenient, adjunct to the Bessemer process, for of the 22 firms that are now carrying on the latter system of manufacture in England and Wales no less than 9 have added thereto the process in question. In some quarters the belief appears to be entertained that in the long run the open hearth will take almost entire possession of the field for ship and boiler plates, while the Bessemer process will continue as heretofore to supply the greater bulk of the material required for railway purposes. The total production of open hearth steel during 1879 was 175,000 tons, which is only a trifle under the production of the previous year; this, however, is an exceptional result. During recent years the open hearth system has made substantial progress. In 1873 the total quantity of such steel made in the United Kingdom was only 77,500 tons; in 1874 it was 90,500 tons; in 1875, 88,000 tons; in 1876, 128,000; and in 1877, 137,000 tons; in 1878 the make was close on 176,000 tons. That the production in 1879 has not been larger is due to the fact that during the latter part of 1878 and the two first quarters of 1879 the make of open hearth steel fell off, but during the last two quarters of 1879, in consequence of additional furnaces having been started, and the improvement in the iron trade, it increased sufficiently to cover the previous decline. Of crucible steel, made in Siemens' regenerative gas furnace, the make in 1879 has been ascertained by Dr. Siemens to be 2900 tons, which is a trifle under the make for 1878, and about 1000 tons less than the make for 1877.

The exports of iron and steel from the United Kingdom during 1879 compare favourably with the returns for the previous year. In the total quantity exported there is an increase of 583,000 tons, and in the value an increase of 1,045,000*l.* over the previous 12 months. It may be remarked, also, that the increase is larger than any that has ever occurred in a single year, the next greatest advance being that of 211,000 tons made in 1872. The volume of our exports of iron during 1879 exceeded that of any year since 1873, when the total was 2,957,000 tons, or 78,000 tons more. Tin-plates and old iron for remanufacture have been sent abroad last year to a larger extent than they have ever been before, while our total exports of railroad iron, although larger by about 22,000 tons than those of 1878, are still far from approaching the figures of a few years ago. In the exports of iron rails there has been a further decline during the year of over 50,000 tons. Within ten years this trade has shrunk from an export of about 1,000,000 tons to one of only 55,600 tons, and from an aggregate value of over 8,000,000*l.* sterling to one of only 296,264*l.* The industrial and technical changes that have recently occurred in the iron trade have had a very material influence upon the consumption of coal. The quantity of coal used per ton of pig-iron made has within ten years been reduced, on an average of the whole kingdom, from 3 tons to 2 tons 4 cwts., and scarcely less remarkable has been the economy induced by the substitution of steel for iron. This change is still in active progress, causing a reduced consumption of at least 2½ tons of coal for every ton of malleable iron displaced by steel; the ultimate influence of this movement can only as yet be imperfectly estimated. Our home consumption remains apparently as great as it ever has been; only during 1875 and again in 1877 was it greater than in 1878, but that source of consumption is maintained not by the iron trade, but by other industries, and above all by the constantly increasing demands of the Metropolis.

The total tonnage of new shipping launched in the United Kingdom during 1879 was 406,029 tons, which is 64,000 tons less than the tonnage launched in the previous year. It may, however, be well to point out that 1878 was exceptional in respect of the shipbuilding done in the United Kingdom, having been exceeded only by 1874, when 603,000 tons were launched; by 1875, when 2000 tons more were launched; and by 1872, when the figures attained the aggregate of 474,000 tons. One notable feature of the past year has been the larger tonnage constructed for foreigners, the total being 49,000 tons, or 7000 tons more than the aggregate of the previous year. As to steel shipbuilding, it appears that between 1870 and 1876, both inclusive, only two ships were built of steel, the one of 97 and the other of 67 tons. In the three following years, however, 23,107 tons were built, and in January of 1880 the approximate gross register tonnage under construction is returned at 40,000 tons. The consumption of Bessemer steel rails has been already referred to; the iron rail trade was all but effete during 1879. The average relative life of steel has not yet been absolutely determined, but it is allowed to be at least twice that of iron. In other words, the average life of the permanent way laid with steel rails may be taken as 20 years instead of 10. Hence it follows that every additional mile laid with steel reduces the quantity of rails annually called for on account of renewals. At the present time there are over 30,000 miles of single line opened in the United Kingdom. Assuming an average life of ten years, that mileage would annually require about 300,000 tons of iron rails for renewals; but if steel were wholly substituted for iron the average annual consumption would be reduced to 150,000 tons. As nearly as can be ascertained the mileage already laid with steel rails in this country is about 11,000 miles, so that already the adoption of steel rails has reduced the average annual consumption on account of renewals from 300,000 to about 245,000 tons per annum.

With regard to the foreign iron and coal trades in 1879, it is remarked that in the United States the production of both iron and steel during 1879 has been estimated by Mr. Swank, secretary of the American Iron and Steel Association, to be larger than that of the previous year. The make of pig-iron is calculated at 2,800,000 gross tons, being about a quarter of a million tons more than the make of 1878. In addition to this production, pig-iron was imported to the extent of 275,000 tons, which is an excess of over 200,000 tons on the importation of 1878, so that altogether nearly three-quarters of a million more tons of pig have gone into consumption during the former year. It is calculated that the production of rolled iron in the United States during 1879 was 20 per cent. more than in 1878, when the total turnout (exclusive of rails) was 1,100,612 tons. America has been compelled to import iron ores to the extent of over 300,000 tons during 1879. Of this large bulk 127,000 tons were received at Philadelphia, including 34,900 tons from Algeria, 73,828 tons from Spain, and 16,809 tons from England. The condition of the German iron trade has been extremely chequered during the past year. At the beginning of 1879, and for more than half of the year, prices were exceedingly unremunerative, and production had been very greatly curtailed. These deficiencies, however, were so far repaired during the latter half of the year that it is believed the full statistics when made up will compare favourably with either of the two previous years. The only district of which the returns are as yet published is that of Dortmund, where the production for 1879 compares very favourably with that of 1878. The production of iron in France in 1866 was 992,710 tons, while in 1866 it was 1,453,112 tons, being an increase of 46 per cent.—nearly the same rate of increase as that of England. There is, however, this important difference between the two countries—the rate of increase since 1876 has been greater in France than in England. If we compare the French production of 1866 with that of 1878 we find an increase of 52 per cent.; or if we compare the production of 1867 with that of 1877 we find an increase in these ten years of 63 per cent., as compared with an increase of 39 per cent. in England during the same period. The year 1879 witnessed a considerable improvement in the iron trade of Belgium. More iron was produced than in either of the two preceding years, and during the last four months much higher prices were obtained.

MARBELLA IRON ORE COMPANY.

SIR,—I venture to address this letter to you in the hope that one of your numerous readers may be able to give me information regarding the operations of the company. Last year these amounted to *nil*. Everything was shut up, and everybody paid off—to wait for better times. These better times came in October, 1879, and found the directors apparently asleep. So much so, indeed, that in the report issued in March (last month) they coolly inform the shareholders that they are now making arrangements for starting the works and recommencing the export of ore.

The directors were right in suspending operations when they could not work the mine at a profit, but surely five months (from October to February) is a long time to prepare to commence work on a mountain of ore, such as Marbella is well known to be, and where there is every facility for shipping—railway and pier being in excellent condition. I cannot help thinking that the directors, through want of energy, have lost to the company at least two months good trade. In regard to this there may be circumstances of which I know nothing; if so, the directors in justice to themselves ought to publish a full report.

Marbella ore commands a higher price than any other Spanish iron ore, Bilbao included. The price of iron ore delivered in ports in this country last February was about 35s. per ton. It is now about 25s. for best Spanish qualities. Freight from Marbella rules from 8s. 6d. to 9s. 6d., and the cost of raising and shipping the ore (labour in Spain is excessively cheap) cannot be more than 3s. 6d. per ton—keeping everything in good repair, let us say 4s. 6d. per ton—add freight, 9s., then the net cost delivering the ore into this country is about 13s. 6d. per ton. With prices down to 20s. this would still leave a fair profit, at present prices (25s.) it leaves a handsome profit.

Now, Sir, I should like very much to know if the works in Marbella are going, or if the directors (failing to make hay while the sun shines) are still engaged making arrangements for re-starting. At present there are two good markets for hematite iron ore—the United States and Great Britain. The United States is undoubtedly the best market, and I believe there is no duty, or at most a merely nominal import duty, on iron ore. The shares of this company (10*l.* fully paid) were dealt in on the Glasgow Stock Exchange as high as 5*l.* before the report was published in the beginning of March. In sympathy with iron markets they have since declined, and the present quotation is about 65s. I am no believer in another great upward bound in the iron trade, feeling sure that the enormous producing power (a great part of which is still in idleness) of this country is of too extensive a character to hope for anything of the kind, but still I think prices are now at their lowest, and that we have every prospect of a few years steady trade. A SHAREHOLDER.

Edinburgh, April 26.

THE GOLD MINES OF SOUTHERN INDIA.

SIR,—Having read the interesting article in last week's Journal upon the Indian Gold Fields and Reduction Processes, I would beg you to allow me to make a few remarks on the second paragraph of the said article. If auriferous pyrites are to be thoroughly treated they must be roasted, but a kiln is not the way to do this; and it is amusing to see that "glazing" and "slags" are spoken of as amongst the results of the operation, for from the very use of a kiln such might be expected. Nevertheless, a proper roasting in a furnace designed for the end in view will, with less consumption of fuel, put the gold scales into a fit state for amalgamation, which will then give a better result than an ordinary fire assay of the same ore.

It is very true that the pyritous material cannot be properly oxidised in a kiln, but it is not at all advisable that the non-pyritous should be sent to a kiln, for that would be simply unnecessary waste of fuel and labour. That a considerable quantity of the gold set free by a good roasting has been found to escape amalgamation can be traced to certain mechanical causes which can be remedied.

I pass over the remarks in the third paragraph about the results achieved by Australian processes, only saying that I think you will find on reference that the bulk of the ore treated in that country has been free gold ore, and that pyritous ores have not given any very great successes. There is no difficulty in dealing with pyritous ores beyond the question of cost, which, of course, depends upon the local facilities for applying the proper processes, and these need an intelligent and conscientious carrying out.

With regard to an estimate in another part of the Journal the quantity of quartz per stamp head per day, given at 2½ tons, is very moderate, if there is anything like adequate water power.

London, April 26. HENRY J. MORITZ.

BRAZILIAN GOLD MINES.

SIR,—Will you permit me to say a few words to the readers of the Journal with regard to the right mines to invest in? Since the forming of the South Indian Gold Mines we have, as it were, been overcrowded with gold mines starting in every direction; but the question is, are they right mines in the right places, and mines that we can rely on? I am afraid that most of them are simply of a speculative character. But out of all this fleet I am glad to see such a concern as the Brazilian Gold Mine launched, a mine that is likely to ensure a great and permanent success; and when we read such favourable reports from experienced men like Messrs. Tregellas, Hilcke, and Martin, we may rest assured that it is honestly brought before the public. The company's property contains eleven mines, all of which assay good results. But besides these there is a mountain of auriferous jacotinga, and this we may look forward to as the first and main stream of gold, and I understand they expect to intersect the jacotinga soon after operations commence. It appears evident the mine abounds in great riches, requiring only working and good management to make it a dividend-paying concern. I must congratulate the shareholders upon the prospects before them—prospects, I may say, that do not crown most of the new gold mines of 1880. Minas Geraes is one of the oldest gold producing regions, but since new ones have been discovered it is almost forgotten, and many people have the idea that it is worked out, but the gold exported in times past was derived solely from surface washings and the rude

crushing by hand. Lacking scientific skill and mechanical appliances the natives were unable to work below the water level, but the richest ore is found at and below that depth. The Brazilian Gold Mines may, in my opinion, be termed a hidden treasure yet to be unearthed, and in the Descoberto Mine there are three lodes from places in which upwards of 100 oitavas (equivalent to about 45*l.*) have been taken out of 20 lbs. of stone. The company have an ample supply of water, the place is most suitable for mining purposes, and with an average yield of about 3 oits. per ton increasingly profitable results may be expected.—*London, April* 29. ——— B. H.

ROSSA GRANDE GOLD MINING COMPANY.

SIR,—Now that Mr. Dawson has returned from Brazil we may soon expect to hear that he has not only arranged matters satisfactorily at the Don Pedro Mine, but at the Rossa Grande also, which latter would in all probability have been wound up years ago had it not been for the riches known to exist there. Shareholders should, therefore, not be induced to part from their shares just at present.

——— AN OLD SHAREHOLDER.

FLAGSTAFF SILVER MINING COMPANY.

SIR,—I understand that various attempts are being made to depreciate the selling value of these shares—among others, that debenture holders who have sold "bears" are talking of petitioning to wind up the company. Lest my fellow-shareholders should consider such a contingency detrimental to the value of the shares, I would inform them that even should the company be actually wound up the shares would still be worth from 3*l.* to 3*l.* 10s. per share held as certificates of scrip, entitling the holders to shares to that extent in the new company. Spite of all the efforts of the "bears" (and they have been many) the shares are quoted 2¼ to 2½, which is considerably below their worth, whatever the enemies of the present company may be able to effect. ——— A SHAREHOLDER.

PANULCILLO COPPER COMPANY.

SIR,—The six months' balance-sheet ending December last shows the handsome net profit of 12,778*l.* 5s. 7d., which, however, still leaves 6531*l.* 0s. 10d. to the debit of profit and loss account. Reading the agent's reports, which must be most gratifying to all concerned, would it not be well if the directors took into serious consideration the advisability of letting the debit balance work itself out gradually, and not longer delay permitting the company to be a dividend-paying one? Their method of giving nothing until quite clear of debt has hitherto been most sound, but, seeing how near this happy prospect is, surely the shareholders might now ask for a little relaxation of the rule, and have an *ad interim* dividend declared, thus avoiding uneasiness to those who have to consider their investments, and permitting the company to take up a fitting position in the share market. If 6000*l.* were taken from last half-year, and 3000*l.* from the present quarter (which must have been a good one), 3s. per share could easily be given, and quarterly or half-yearly dividends continued with but little prejudice to the profit and loss account, seeing the prosperity of the mine and its evident removal from anything speculative so far as produce is concerned. ——— SHAREHOLDER.

LEYCETT COLLIERY VERDICT.

SIR,—Sir William Harcourt could scarcely inaugurate his reign at the Home Office more appropriately than by holding an early levee of his Mine Inspectors, and seriously considering the great explosion question in its relation to the use of gunpowder in blasting. Some few weeks ago I pointed out in your columns the absurdity of lamp-locking while blasting powder was allowed to produce a great volume of flame alongside the locked lamps. The Leycett verdict yesterday admits that the firing of a shot produced the explosion there, and curiously enough absolves everyone from blame. Perhaps it would be hard to attach blame to an individual when the Government stirs no hand to arrest this shot-firing, notwithstanding that their Inspectors' reports, of which I send you a copy, contain case after case in which these death-dealing shots have occurred. If this were a question affecting railways and first-class passengers, Mr. Moon or Mr. Allport would be compelled to provide a remedy. Among the list of patents there is one for blasting by compressed air. Might not some official report upon this machine? ——— ELLIS LEVER.

Manchester, April 29.

MACHINE MINING.

SIR,—Although there has been a slight drop in the price of metals there is still an ample margin between the cost of production and the price obtainable for ore to place a fair amount of profit at the disposal of the executive. But the question is whether mine adventurers are utilising their present prosperity in such a manner as to make it permanent. I fear all are too anxious to have every penny of profit distributed as dividends, without thinking of the future. Improved machinery—especially rock drills and air compressors—is now proved to make just the difference between loss and profit in many mines, and if a few dividends were foregone, and the amount applied to the purchase of such additional plant as is required for rapid mining, now quite necessary to enable us to compete with foreign countries, permanent profits would be secured.

It is useless to introduce machinery by driblets—a small air compressor and a couple of drills where 500 men are employed; what is required is a rock drill in at least half the ends, and such an alteration in the principle of working that any lodes discovered shall be taken down twice as quickly as at present, and at a lower cost. Matters have altogether changed within the last ten years, and taking by way of example the copper mines of Cornwall and Devon, we shall see that a radical change is absolutely necessary. The aggregate amount realised for all the copper ore sold at the Cornish ticketings within the year ended March, 1880, was 149,598*l.* 7s., the output of the mines selling being 41,264 tons of ore, containing 2814 tons 11 cwts. of fine copper. Compare this with one year's sales of the Rio Tinto Company, and if the year 1878 be taken the comparison will be in consequence of the lower prices prevailing favourable to the Cornish mines. We find the Rio Tinto output was 871,107 tons, or more than 21 times the output of Cornwall and Devon combined. This Rio Tinto ore contained 4184 tons of fine copper, and by shipping 218,818 tons of the ore to Great Britain, and treating 652,289 tons on the spot, the Rio Tinto Company obtained 230,387*l.* 17s. 10d. profit, while the whole of the Cornish and Devon ore was sold for 149,598*l.* 7s., out of which all the cost of mining and getting it to market had to be paid.

These figures are startling, but they are something more if they be further analysed. The home miners selling at the Cornish ticketings received but 53*l.* per ton of fine copper in the ore they sold; the Rio Tinto Company received 55*l.* per ton *profit*. Yet the Devon and Cornish ores averaged 6¾ per cent. produce and the Rio Tinto ores averaged less than ½ per cent. produce. Nevertheless the Rio Tinto Company treated the 871,107 tons with a profit of 5s. 6d. per ton all round. The only conclusion that can be drawn from this is that the Devon and Cornish miners are very unfairly paid for their ores, or that the system of working is defective. I incline to the latter view, and believe that all that is required to make home mining as far more profitable than Spanish as the produce of Cornish ores is higher is abundance of machinery.—*April* 26. ENGINEER.

CARN CAMBORNE.

SIR,—I see that an old bal is extensively advertised as one of the best speculations going. I allude to Carn Camborne, which, according to circulars which I have received, can be bought at the extremely low price of 45s. per share. Some time since I read an account—a very glowing one—of the re-starting of this mine, and that a call of 2s. 6d. per share had been made, amounting to 750*l.* One naturally asks oneself what can be done in re-opening a mine for 750*l.*, and how comes it the shares, upon which 2s. 6d. only has been paid, are now not to be obtained under 45s.? To those who think of investing it may be interesting to know that a few years since this mine was stopped, after something like 30,000*l.* had been expended on its development by the adventurers. I was, unfortunately, a large shareholder in the undertaking, and can, therefore, speak with certainty as to the history of the mine in the past. Should any of your readers doubt what I say the truth or otherwise can be easily verified by reference to the columns of the Journal for the year 1872-3.

A LATE ADVENTURER IN CARN CAMBORNE.

THE INDIAN QUEEN'S MINING DISTRICT.

SIR,—I am not aware that the above title has ever been adopted before for the mines surrounding the little village known by the name of Indian Queen's, near St. Columb. The name is derived from the sign of Indian Queen, attached to an inn, long known as a road side refreshment public-house between Truro and Bodmin, where in the old coaching days they used to change horses, and where, also, especially before railway times, general travellers were wont to stop. Since the opening of the Cornwall Railway the traffic over the (late) turnpike road here has been diverted in some measure; but it is probable that the revival of mining in the district will bring a good custom to the Indian Queen's Inn, which is well kept by Mr. Dean, who can afford "good accommodation for man and horse." Of all the districts in the county of Cornwall which have been neglected while deserving of attention this is the best. More tin from above sea level has been supplied to the smelters from this district than from any other in the county. There are only two mines in this district that are so deep as the sea level, and those are Wheal Basset and the Barton Mine. The richest tin lode ever discovered in Cornwall is in this district at the Parker Mines; between the 10 and 30 it yielded in a length of 15 fms. 40,000*l.* worth of tin, which is more than either Wheal Vor or Dolcoath ever did within the like dimensions. This mine will be resumed and worked fairly (which it never has been heretofore) as soon as the Stannary Court officials have disposed of it, which will probably be in a few weeks. The gentleman in whose hands it has been kept was not in circumstances to purchase the machinery required for sinking the engine-shaft which is necessary for the development of the lode below the 30, and no persons would join him on his terms. It is believed by miners that there will be a prosperous future for this mine.

I am glad to find that Tolldish Mine is about to be started by a limited company in 10,000 shares of 1*l.* each. I am satisfied from the samples taken from the lodes intersecting this sett that there is little, if the least, risk in applying capital for their development. The old men not only "backed" the lodes, but cut two adits in succession—the first at 5 and the second at 9 fms. below the surface. More recently another adit was driven about one-third of a mile to cut the lodes at 20 fms. from surface, and this adit is only about 80 fms. from the main lodes. These works indicate the high opinion formerly entertained of the character of the lodes, which opinion is entertained still. Tolldish is the central mine of the whole group. At the west is Parker Mine, Treliver at the north, Fatwork and Wheal Virtue at the south, Gavrigan at the south-east, Castle-an-Dinas and Tregoss Moor at the east. All those mines have yielded large quantities of tin. In the district there are also the following mines:—Penhale and Barton, Chyprase, Bartly-row, and Wheal Basset. None of these mines have been extensively worked. I have been informed that several practical miners have visited Tolldish, and reported very favourably on it, and that operations have been commenced under the management of Capt. W. H. Bullock, who I know is a good miner. Retew Iron and Manganese Mine is in this district; I called at the mine to-day on my way to another place, and saw a rich specimen of manganese which was taken from the lode to-day. The registered name of this mine I am told is the West of England Iron Ore Company (Limited).—*Truro, April* 27. R. SYMONS.

LEAD MINE ENTERPRISE IN LLANARMON.

SIR,—The importance of this subject is my only excuse for troubling you with a few notes on the matter, and I am glad to see in last week's Journal the past and probable future importance of the county of Denbigh as a lead producing area is brought prominently forward. I have before written, and I now write again, in the interests of the district of Llanarmon. I have been making investigations both by letter and on the spot, and I wish to bring to the notice of your readers, who are capitalists and desirous of investing their money in lead mines, the advantages that may be obtained by joining in the scheme of amalgamation of certain properties to concentrate their capabilities under one company, one management, and at a great saving of separate fixed charges which would otherwise be incurred in separate enterprises. I would, therefore, recommend that the late Bryn Alyn Company, if resuscitated, should, if possible, arrange with the owners or lessees of the undermentioned properties to absorb them into its management so as to enlarge its own area:—Nant Adda, Plas-yn-Pant, Lady Ann, Bryn-y-Mwyn, Pant-y-Gwlanod, the old Westminster property, and any others on their line, adjoining or surrounding them, that may add to their value.

A great company will be the result, as being—1. Large in extent as to area.—2. Valuable to begin with as a highly mineralised property, and work already done and at present going on.—3. All would be under one management, such as directors, agents, &c.—4. A great saving would thereby be effected in working expenses and many other ways, such as being able to purchase largely of any goods for necessary work, stores, &c.—5. Greater capital would more likely be brought to bear in working than by small disjointed efforts, and perhaps, in some instances, opposing interests prevented. To accomplish this I would recommend as a preliminary step that the most thorough and exhaustive inspections should be made of all the properties arranged to be joined together:—1. On account of the new company as intended; 2. On account of the private owners and lessees of the properties named. To do this thoroughly, and to obtain gentlemen who would command the confidence of capitalists, I would respectfully suggest the names of Captain Hotchkiss, of Bodidris, Capt. Absalom Francis, of Gwernymynydd Lead Mining Company, Mold, Capt. Wm. Francis, M. and C.E., Northop, for the former; and for the latter, Capt. J. A. Ede, of Lead Era, Capt. Miners, of the Flintshire Mines, near Mold, and Capt. Goodman Ellis, of North Hendre Lead Mines.

The reports of these gentlemen would be sure to inspire the fullest confidence in the soundness of the proposed amalgamation. I throw out these ideas for what they are worth, and shall be glad to have them more fully elaborated by some of your able correspondents who are well acquainted with such matters. After inspection, I would lay the whole scheme before some eminent and influential financial agent, or agents, in London, Manchester, Liverpool, or Chester, and put the price at a reasonable amount, and the scheme, in my opinion, would be sure to carry. To such a company I would gladly become—*April* 26. ——— A SUBSCRIBER.

MINING IN CARDIGANSHIRE—SOUTH CAMRRIAN MINES.

SIR,—Having received several letters from correspondents asking for further information about the progress and prospects of the South Cambrian Mines, I consider it more in accordance with my position, as manager for a limited company, to answer through the columns of the *Mining Journal*, rather than by means of private communication, to give information to one which another may not have the advantage of possessing. Capt. Absalom Francis, of Goginnan, has officially inspected and reported upon these mines last month at the request of the principal shareholders, and after stating all the particulars of his inspection, the following is the concluding paragraph of his report:—"I must congratulate you on having obtained what I consider the best mine in the Principality, and it is a source of infinite pleasure to me also to see that all my predictions as to its richness are more than verified."

The report of a gentleman of Mr. Francis's knowledge and experience in mining matters needs no verification on my part, but for the information of my correspondents I can say, as manager of the mines, that to the best of my judgment his report neither overstates nor overestimates anything as to the present and future prospects of the South Cambrian Mines, and as in the course of our workings we have accumulated considerable stocks of metallic ores for crushing and dressing, we are in a position for finding immediate employment for our machinery when completed, and as our water-courses are constructed, our wheel erected, and all other appliances and machinery prepared and in course of being put together with the utmost rapidity, there is no doubt we shall be able to start our machinery complete in May, from which time, as Mr. Francis in his report states:—"The South Cambrian Mines cannot fail to make large returns and profits, which must increase from month to month and year to year during the term of the present company's lease, as work as they may they must leave immense quantities of ore in that mine for generations yet to be born." The secretary of the South Cambrian Mining Company is Mr. Arthur John Watkis Stringer, Byrom-street, Manchester, to whom I must request after this public communication all future enquiries about these mines may be addressed, as it is not within my province to answer such. ——— ANDREW WILLIAMS.

LLANRWST MINE, AND ITS MANAGEMENT.

SIR,—If Llanrwst dies it will die through want of confidence in its management, and that want of confidence is natural, perhaps justified. Some years ago, when I bought a good many shares of the late Mr. Endean, I particularly asked him whether there was the least possibility of the mines being stopped through want of funds. He ridiculed the idea, and pointed very triumphantly to the reserves of lead already laid bare.

Since that time I have carefully kept and filed every paper that has been issued and reached me about Llanrwst, and unless memory deceives me the reserves of lead were once put about as high as 40,000*l.* But we were cautioned not "to pick out the eyes of the mine." Now, man or mine, picking out eyes is a painful process no doubt, but if nothing else will save a man's life it ought to be done; and so also of mines. I think Colonel Roden's question was just to the purpose; and that Capt. Knapp's answer was very cheeky but evasive. Other young mines have paid their way, and if the truth had been told us Llanrwst is competent to do so. But if we have been deceived in the past what shareholder can have confidence in the future?

If 1500*l.* or 2000*l.* more be wanted and no more, or a little more, no doubt it could be easily got from the 600 shareholders. But it was too bad of Capt. Gilbert to shock us by saying that fresh shares should be subscribed for *pro rata*. That means to say that those of us who have already found most of the expended money should still find more to be expended—with as little return. It was very nice of Mr. A. Endean and Capt. Knapp to subscribe one 100*l.* and the other 40*l.* They are very good boys indeed, and I hope, if things go well, they may possibly get their money back again. The misfortune is that men like myself have no means nor chances of getting back ours. We have been so tickled with expectation that we are sick.

Is it possible that Llanrwst has some pressure on the brain and is paralysed? Great Laxey was once in a very bad way; recourse was had to drastic treatment, and it has flourished ever since. Some time ago some one served Tankerville a very shabby trick. The mine has been down ever since, though at present with good prospects of recovery. Who shall say how many guinea-pigs there are in London? Some three years ago I was told by a stockbroker that Llanrwst would never pay a dividend under its present management; whether he told a falsehood I cannot say, but that it is very likely he told one I am certain.

What the upshot of last week's meeting was or what it was intended to be I can hardly make out. I hope there is no foreseen or predetermined scheme of winding-up Llanrwst for the benefit of expectants. Can nothing be done to revive broken confidence? How is it that nearly all shareholders have thought alike, and refused for the present the preference shares? They are not all, or most of them, without the means to take a few more. Is there no skilful operator in London bold enough to trust Llanrwst? There it lies—a mine of riches! Years ago Capt. Knapp said he could raise 60 tons a month, but that would not pay a dividend. He has just raised another 50 tons; let him continue to do so and pay expenses. But if more money is required to expedite operations some better effort must certainly be made to revive the confidence of your—

——— COUNTRY SHAREHOLDERS.

THE LLANRWST MINE.

SIR,—Having attended the meeting of shareholders, on Tuesday, the 20th inst., and having heard the statements of the several speakers who addressed the meeting, all of whom confirmed the reports made by our own and other most respectable agents respecting the unquestionable value of the mine both as respects the present and the future, and also what must be the inevitable consequence to us if we decline to support and promote our own interests by a little further contribution in order to sink the shaft the required depth for another deeper level. It appeared to me incontestible that the mine is one of no ordinary value, that its intrinsic and prospective worth is wholly beyond successful cavil or dispute, and that the exigencies under which it is now labouring are merely of an ordinary order, incidental at one stage or another to all mining. I understood at the meeting that the greatest depth to which the mine has as yet been wrought does not exceed 30 fms. from the surface, and that upwards of 600 tons of lead ore have been already taken out of the mine by the present company, and this without in any way impoverishing the prospects, as it was also stated that more than a moiety of the ore which has been discovered was still standing fully developed in the back of the adit, whilst all below, with the exception of a comparatively few fathoms which have recently been taken away from the newly projected stopes at the 14, remain intact throughout the mine. These facts being unquestioned—and I presume unquestionable—otherwise they would undoubtedly have been challenged—serve to show most clearly the substantial and indisputable data on which the estimated value of the ore in reserve was arrived at.

It was also stated at the meeting that the future prospects of the mine from its deepest development were of the most satisfactory and assuring character. I was led to the conclusion, from a statement made by Mr. Endian, that he has had the mine critically inspected by several agents, all of whose reports have been printed and sent to the shareholders, exhibiting an unanimity of opinion respecting its value unsurpassed, if not unequalled, in respect of almost any other mine—that ample evidence has been afforded, both of a moral and material character, of the intrinsic wealth and unquestionably favourable prospects regarding its future value and success. I noticed in one of the agent's reports which had been sent to me that it was stated the mine is not a speculation, but an investment. Nothing truer than which, relatively to facts, could, I think, have been expressed, yet we are in a difficulty from financial embarrassment; and the question now is, what are we going to do about it? Are we going to show the white feather, and provide for ourselves the mortifying humiliation of seeing others reap the fruit of what we have so abundantly and so—in respect of the discoveries made—successfully sown? It appears to me just as sensible to abandon a valuable ship, stranded, with its thrice-told valuable cargo on board, to the tender mercies of the merciless waves to disengage itself from its difficult and perilous position as to leave the Llanrwst Mine without the aid and succour it temporarily requires. I hope the directors, in case there is not a sufficiently generous response to their appeal on this behalf, will lose no time in convening a special general meeting, for the purpose of definitely deciding whether to find the means to do what is necessary to the success of the mine, or of winding up the present company. Something must be done, and the sooner the better for all interested.

If the additional capital was required for speculative purposes, instead of for merely extending the developments into ground already demonstrated to be valuable, a certain amount of hesitation on the part of some shareholders might not only be justifiable but expected; but when it is simply required for the purpose of extending the ordinary roadways, so to speak, into what is sufficiently evidenced, and indicated chambers and channels of wealth, it is scarcely within the bounds of reason to supply an answer why the shareholders should betray any hesitation in the matter. To say we have been disappointed in our expectations concerning the mine would be very true; but no reason for conduct so suicidal as stolidly standing aloof and tacitly opposing its reconstruction, and renewal of a more healthy, vigorous, and enlarged life. It is probably true that some of us may have bought our shares at prices exceeding their marketable value at the time; but if so, the fault must have been principally our own. But even that, though it would be unpleasant to reflect upon, would be no sufficient reason—nor, indeed any reason at all—why we should not do all in our power to realise to the fullest extent all that the mine is legitimately constituted to

supply. I appeal to reason, which should ever be permitted to exert its controlling influence over prejudice and passion, and ask if we have not, in the several reports which have been placed before us, together with the explanations and statements therein and otherwise supplied, ample and substantial data for forming and entertaining the most favourable views and conclusions concerning the great value of this property, which if we lose or sacrifice any part of it, we shall have none to blame but ourselves or each other. It would, however, be better for all parties interested to generously acquiesce in the inevitable, and regard the adventitious occurrence of a hard channel of ground at the 14 fm. level as a merely temporary derangement of our affairs, as it cannot certainly, from all the evidence adduced, be anything more, and push on the developments beyond and below those casual depressing interceptions, which are almost wholly incidental, if not absolutely peculiar, to shallow depth mining; and as an advocate of such a policy I stand prepared to respond to any reasonable appeal with my proportion of the amount rendered necessary. A LARGE SHAREHOLDER.

[For remainder of Original Correspondence see this day's Journal.]

Meetings of Public Companies.

LAST CHANCE SILVER MINING COMPANY.

An extraordinary general meeting of shareholders was held at the offices of the company, King William-street, on Monday,

Mr. JOHN PORTER in the chair.

The notice convening the meeting, which was read by the CHAIRMAN, stated that it was called for the purpose of passing a special resolution with respect to the arrangement for the transference of the company to the New Chance Mining Company.

The CHAIRMAN moved "That the arrangement entered into by John Porter, the liquidator of the company, and embodied in an agreement dated the 12th day of April, 1880, and made between the said John Porter of the first part, and Charles Coles Adley and Henry Andrew Root of the second part, and Erwin Davis of the third part; and an agreement dated the 14th day of April, 1880, and made between this company of the first part, the said John Porter of the second part, and the New Chance Mining Company (Limited) of the third part, be and the same is hereby ratified and confirmed, and that the liquidator be authorised and empowered to carry the same into effect, and to receive, as compensation for the transfer of the property therein mentioned, the fully paid up and partly paid up shares in the New Chance Mining Company (Limited) in the said agreements specified, and to deal with the same in manner by the last-mentioned agreement provided."

The motion was carried *nem. dis.*, and the proceedings, which were of a purely formal character, then closed.

SOUTH-EAST WYNAAD ESTATES AND GOLD MINING COMPANY (LIMITED).

The first general meeting of shareholders was held at the Cannon-street Hotel, on Wednesday,

Mr. H. PALMER STONE in the chair.

Mr. W. H. THOMPSON (the secretary) read the notice convening the meeting.

The CHAIRMAN said: Gentlemen, I have much pleasure in meeting you here to-day. You are aware this meeting is the statutory meeting, which we have to hold within four months of the registration of the company, and some of you may, perhaps, have wondered why we have called you together a month before that time. We have done so because, having completed all that is at present possible towards developing our properties, we thought it advisable to tell you what has happened since we allotted our shares, and enable you to judge for yourselves of the position and prospects of the company. First, then, we will take as the title goes—the Estates business. As stated in the prospectus we were going to do, we have engaged the services of Mr. Charles Royal Dawson, for many years resident in the district, and to whom (aided by our valuable friends, Messrs. Stanes, Watson, and Co.) we are mainly indebted for securing the properties on what, compared with the prices now being asked for land in the South-East Wynaad, we are gratified in saying are very moderate terms. Mr. Dawson has safely arrived at Madras, and will proceed directly to the estates, it, indeed, he has not already started. He will act as resident manager, continue the cultivation of coffee, tea, and cinchona, and will to some extent act in conjunction with and control operations of the mining staff. Messrs. Stanes and Co., of Coonoor Coimbatore and Beypore, have accepted our agency, and being near at hand we shall benefit by their valuable advice. Messrs. Oakes and Co. will watch our interest at Madras. The crop of coffee which was included in our purchase has been duly harvested, the first portion off the Needle Rock estate having been sold yesterday at auction, realising favourable prices. Another parcel from this estate is on the road, and will be shortly disposed of. From the Richmond property a quantity was shipped by the steamer Amelia, which vessel has been totally lost, but we are well covered by insurance. We can, I think, safely estimate on something like 5000*l.* for this crop. We shall increase the cultivation of tea and cinchona—of the latter we have 20,000 trees planted, and shall go on with some thousands more. These crops will go some way to improve your dividends. Now, gentlemen, as to gold mining. We are, I may say, in a favourable position, having secured properties with most valuable reefs on them, not merely mining rights on other people's land, and, therefore, we have no fear of differences of opinion with planters and other occupiers. Without troubling you with details or independent opinions I shall refer you to the report on the "Gold Mines of the South-Eastern portion of the Wynaad and Carcoor Ghet," printed by Eyre and Spottiswoode. This is a most perfect report on the whole district, and is written by Mr. Brough Smyth, who surveyed on behalf of the Government of India, who naturally take a very great interest in the matter. He reports most favourably on our properties, and you will find them mentioned on pages 19 to 20, 22, 23, and 37. We have only one difficulty, and that is all the reefs are equally auriferous and promising, and we hardly know which to begin with. In order, however, to settle this question we very fortunately for you secured the services of Mr. Oliver Pegler as consulting engineer, and he has left on the 17th of this month overland for the estates. This gentleman may fairly be described as the pioneer of Indian gold mining, and he has an intimate knowledge of the properties—indeed, of the whole district. He threw himself with great energy into the work, and owing mainly to his activity and knowledge of what was wanted we succeeded in our plans being carried out so quickly. I must say we are indebted to him for the forward state of our preparations. Captain Roberts (a miner of great experience in gold works), and five picked Cornishmen left also on the 17th instant, per steamer Almora, for the company's property in India, and we shipped certain machinery on the same day; more is following immediately, so that the staff will commence operations shortly after their arrival. As to the question which has often been asked—Will the gold pay for producing?—I can only say that we have every reason to believe it will, and that handsomely. Labour is cheap, and we have skilled labour also in the tribe of Korumbars, miners themselves. Wood and water in plenty, and no great transport difficulties, so that we are not to be compared with Australia in that respect, where wages are ten times what we expect to pay. In conclusion, gentlemen, I have only to say our last telegrams from India report the transfer of the properties going on satisfactorily at Madras. The deeds have arrived all safely there, and we are advised by our solicitors that the purchase money may now be wanted any day. This being the case, I may, I think, congratulate you on being purchasers of valuable properties, some 1500 acres in extent, in full working order as estates, and with prospects second to none for gold mining, our supply of quartz being enormous. We have not been idle, and I think I may ask for your favourable verdict to-day. We have ample means to develope our resources, and we trust that when we meet you next year we may have a good account to put before you. There are numerous companies in the field, but there is room for all and gold for all, so we have no spirit of jealousy or rivalry. I have no more to add, except to remind you that you have to appoint an auditor, or two auditors, as you may think best. You may appoint him from amongst your own body or professional; we have no choice in the matter. Any questions you may ask I or my colleagues will be happy to answer.

A SHAREHOLDER asked whether the company's mining rights extended over the entire property, or whether there was any reservation on that point?——The CHAIRMAN said the prospectus contained full information on that point. On the Needle Rock Estate the company already possessed 15 acres of mining rights, and had the right of taking the whole in five years.

The SHAREHOLDER: Then no one can come in over our head?——The CHAIRMAN: No, it will be our own land; we have the right to take the mining rights when we think fit.

A SHAREHOLDER asked whether the terms were fixed on which the mining rights were to be taken at some future time?——The CHAIRMAN: Yes; on very small terms indeed.

The CHAIRMAN, in answer to a SHAREHOLDER, said the estate might be called freehold; it was a renewal in perpetuity.

A SHAREHOLDER asked whether it would not be advisable to have the shares divided into 1*l.* shares? He believed that many persons were under the impression that the shares were 1*l.* shares, and not 2*l.* shares.——The CHAIRMAN: If the solicitor advises that our 2*l.* shares can be made into 1*l.* shares I will agree to it. (Hear, hear.) I believe that most people on the Stock Exchange believe they are 1*l.* shares, instead of 2*l.* shares fully paid.

The SOLICITOR said that in order to divide the 2*l.* shares into 1*l.* shares it would be necessary to alter the Memorandum of Association, which was not so easy as altering the Articles of Association. It was by the Memorandum of Association that the shares were fixed at 2*l.*, and any alteration in the Memorandum would involve some expense and delay, and unless there was a reason for reducing the shares to 1*l.* he would not advise them to do it.

The SHAREHOLDER said that the property suffered in the market value from it being supposed outside that the shares were only 1*l.* He thought it would be more satisfactory, even if it involved some expense, that the shares should be quoted as 1*l.* shares, with a certain definite premium.

The CHAIRMAN said he agreed with this view. Of course, it was merely a matter of policy. If the solicitor advised that it should be done, and if it also met with the views of a large body of the shareholders, the directors would take the matter into consideration and see what could be done.

A SHAREHOLDER said that he (and probably there were others of the same opinion) did not agree with the suggestion relative to reducing the nominal value of the shares.

The CHAIRMAN said of course it would not be done unless with the approval of a considerable majority of the shareholders.

A SHAREHOLDER asked whether the shares would be quoted on the Stock Exchange?——The CHAIRMAN said the papers had been before the committee, but there was an enormous pressure of business; but he thought that on Monday the shareholders would see the shares quoted on the market.

A SHAREHOLDER: I suppose the whole of the shares were subscribed for?

The CHAIRMAN: The whole of the shares have been over-applied for.

Messrs. Turquand, Young, and Co. were then appointed auditors, with a remuneration of about 50 guineas.

A vote of thanks to the Chairman closed the proceedings.

RIO TINTO COMPANY.

The annual general meeting of shareholders was held at the Cannon-street Hotel, on April 23,—Mr. H. M. MATHESON in the chair.

The SECRETARY read the notice convening the meeting and the minutes of the preceding one; and the directors' report and statement of accounts were taken as read.

The CHAIRMAN said: Gentlemen, when we have met our friends here on former occasions it has been with no little solicitude, because, in the first place, we had nothing to give, and in the next place it was extremely difficult to convey to those whom we addressed, however much we desired to do so, the strong hopes we entertained that beneficial results were merely delayed. This has happily been made apparent now, and we should be more than human if we did not felicitate you and ourselves upon the great change of feeling, warranted by the promising position of the company, which has taken place in the interval between last general meeting and the present. The constant and untiring attention which we have given to the company's interests, the stroug support received from the commercial agents of the company, combined with the skill and diligence of an excellent staff, under the able management of Mr. Chas. T. Prebble, have now, with the blessing of Divine Providence—(hear, hear)—brought us quite through the preparatory stage, lengthened as it has been far beyond what we anticipated; and we confidently expect, in consequence of the large and steady production, combined with diminished cost, that your directors will now meet you year by year with results that shall be in a greater or less degree satisfactory, notwithstanding the variations that must be expected in the state of the markets for the company's produce. (Applause.) I can never forget the remarkable kindness and confidence with which we have been invariably treated by you; and while I think I may promise you the same care for your interest in the future, I cannot wish for a more kind and considerate estimate of our exertions. It will now be my duty to explain briefly the several matters referred to in the report, taking the accounts last; and I need hardly say that if there should be any points which any of the shareholders do not think made sufficiently clear, or in regard to which further information is desired, I shall be most happy to answer any questions, in so far as this can properly be done in the interest of the shareholders themselves. It is difficult to convey to those who have not seen the mines an adequate idea of their magnitude and resources. The surveys made by the Spanish Government having been found in the course of our working to be somewhat imperfect and misleading, we are having careful surveys made of all the lodes, and so far as we have gone the result has been amply to confirm the most sanguine statements which have been made of the extent of these mineral deposits. In the north lode alone, which is as yet quite untouched by us, it is estimated that there is enough to last the company at the present rate of consumption for 100 years; and as it is more than probable that, in spite of the changes which occur around us, there will continue to be a demand in the world for sulphur, copper, iron, and silver, so it must be satisfactory to the shareholders to know that they possess in their property in Spain so large a fund of these minerals, and the most complete and efficient means for their being turned to account. (Applause.) Besides conducting these surveys, aided by diamond boring-machines, we have been taking all needful steps to open up the reserve lodes, and get them ready for economical working at a later period. Meantime in the south lode, where the extraction has hitherto been made, we have ample mineral for several years to come, and the quality and copper contents improve. During 1879, 906,600 tons of ore have been extracted from this lode. Part of this quantity, as you are aware—say, about 240,000 tons—was shipped to England and Germany, but the greater part was as usual subjected to treatment for the extraction of copper on the spot. Hitherto the crude and unscientific process of calcining the ore in heaps has been the principal means employed; but there is a disadvantage attending this, owing to the sulphurous fumes which envelope the place and spread over the surrounding country—not only sacrificing the sulphur, but destroying the vegetation on the company's large landed property, and leading to claims from others for damage to vegetation of a serious character. It has always been our strong hope that chemistry would do something to turn this evil into a good, and we have made numerous experiments to arrive at some practical scheme for utilising the sulphur fumes produced by calcination, and also for extracting the copper in a cheap and efficient manner without calcining. These problems we believe we have now solved—(hear, hear)—by experiments conducted on a large and commercial scale. As regards the last of them we are now extracting, under the Doetsch patent, 15 to 20 tons of copper per week from a heap of smalls, and are commencing to replace the teleras, or burning heaps, by machinery for grinding the raw ore. The cost of producing copper by this new process is conclusively proved to be less than by the old, besides which the sulphur and iron remain in the ore after treatment; but, above all, there is the inestimable advantage of doing away with the sulphur smoke. As regards utilising the fumes for the production of sulphur we cannot yet speak so positively, although the process adopted is being conducted with good results. I have spoken of silver, but hitherto the company has not reaped any advantage from this valuable product. From experiments recently made at the mines we have every reason to hope we shall be able to extract from our residues a paying quantity of silver. As mentioned at the last meeting the water supplies are now very ample for all possible wants, and we have largely added to the pumping power, so as to make the water available to the utmost extent for the extraction of copper. The precipitate copper manufactured and shipped by the company maintains its high quality and reputation, and yields an average of 75 per cent. metallic copper. The copper made in 1879 amounted to 7451 tons of 21 cwts. net, after allowing for draft and moisture. Of this a portion remained at the mines in the form of wet precipitate, and 113 tons were on the way to England on Dec. 31: 7104 tons net have come to credit. It may be expected that I should explain the reference in the auditors' note, attached to the accounts, to four instances in which sales and deliveries of produce were not completed before the close of the year. This refers to copper precipitate actually made within the year from Jan. 1 to Dec. 31 last. In each of these cases sales had been previously made; the precipitate was shipped in December, and the deliveries to buyers took place on Jan. 5, 14, 16, and 28 of this year. It is with the greatest reluctance that I venture to differ from so high and so much esteemed an authority as Mr. Young. But I think it clear that the justice of the case would assign to the partner of 1879 the result of his manufacture, upon which his capital, labour, skill, and everything had been expended, his sale contract actually made, and the goods shipped all within the year, leaving only the actual delivery of the goods to the buyer against his money, and this completed in January. (Hear, hear.) That such produce should be taken over at actual cost only, which Mr. Young contends, appears to me unfair. Market value is surely the proper principle on which to estimate goods in that position, and when an absolute result of account sales can be got long before your books can be closed I should think there could be little doubt of the advantage of adopting the exact figures. (Hear.) In the present case if these four sales were struck out it would make a difference of one-half per cent. dividend to the shareholders. I think I am safe in saying from the progress made since Jan. 1 that we shall make from 1000 to 2000 tons more copper in the current year. I may add that although the copper market is at present weak our sales made during the present year have averaged from 9*l.* to 10*l.* per ton higher than the average price obtained in 1879. Our deliveries of pyrites for 1879 were 230,731 tons of 21 cwts., the copper in which amounted to 5661 tons of 21 cwts. Our sales of pyrites for 1880 here and on the Continent amount to 270,000 tons. The sales of hematite iron for the first time form a satisfactory feature in the company's business, but no portion of it comes into the accounts for 1879. We have made a further sale since the report was printed, raising the total quantity sold to over 10,000 tons. We use, as you are aware, about 1½ to 1¾ ton of pig-iron for every ton of copper produced by cementation at the mines. Therefore, the item of iron is a very large and important one. With our present great works, and employing as we do more than 7000 men at Rio Tinto, we hardly see our way to undertake this new industry at present. At the same time there can be little doubt that a large saving in the cost of the iron could be made by doing so, the import duty alone being 1*l.* per ton; and your directors would give every encouragement to the formation of a friendly company with whom satisfactory arrangements might be made. I may also mention that a cargo of the company's hematite iron ore is being smelted at this moment at works in Wales, and the company that is using it have given us a most satisfactory account of its quality, and of the results obtained from the smelting. In regard to the accounts, you will have observed that having an amount of over 60,000*l.* at the credit of a reserve account, we acted upon the resolution of the last general meeting by debiting to that account the balance 58,479*l.* 8s. 6d. then remaining at debit of revenue, and we did it the more readily because the said balance was inherited entirely from 1877, a year in which the mines were not yet fully developed and prepared for turning out a sufficient amount of produce. That state of things ceased with 1877, and there has been marked progress in each of the two succeeding years. Our profits on produce for 1879 have amounted to 443,930*l.* 8s., or with trifling additions 459,433*l.* 15s. 10d. Interest on bonded debt, &c., absorbed 232,471*l.* 0s. 8d. General charges and administration 28,352*l.* 18s. 2d., and we have also charged to revenue the amount paid for the sinking funds, or the redemption of mortgage debt—84,191*l.* This leaves a net balance of 114,418*l.* 17s. available for the purpose of a dividend on the shares. We have peculiar pleasure in recommending a dividend at the rate of 5 per cent. or 10s. per share, which will absorb 112,500*l.* and leave 1918*l.* 17s. to be carried forward to the new account. The reserve account stands at 112,964*l.* 3s. 5d., which, as the auditors remark, may in the meantime be regarded as a depreciation fund. The position of the company being now so far assured, we have had it in view to consolidate our finance by such an issue of bonds as will cover all our indebtedness, and not only capitalise the entire floating debt, but by extending the period for the redemption of the bonds, lessen the annual charge to the company. I exclude of course the 5 per cent. (or, as they are called, Spanish coupon) bonds. These will continue as at present, and will be entirely liquidated in 15 years, when the new series which we propose to issue will be secured by a first mortgage upon the mines and upon all the company's property. Your directors are empowered by the Articles of Association to borrow up to 2,000,000*l.* sterling over and above the 5 per cent. bonds. In order, however, to effect the favourable arrangement just referred to, we are about to propose to you a resolution which, while it will enable us to effect a considerable saving on the annual charge for interest and sinking fund, shall give us authority to create an additional amount up to 500,000*l.* Negociations could not be concluded until we had received this authority, and it is not, therefore, desirable to enter into further details, but they are sufficiently advanced to enable me to recommend the proposed issue to the shareholders, to whom the prospectus will shortly be issued. We shall save, I believe, more than 50,000*l.* per annum, by the step which we propose to take, in the annual charge which would have had to be made against the company had other measures been adopted. (Hear.) I will now conclude these remarks by moving that the report and accounts now submitted be received and adopted.

Mr. MACANDREW: I beg to second that.

The CHAIRMAN: Before submitting the other resolutions, which are very much formal, excepting that relating to the 500,000*l.*, I desire to say that if any of the shareholders present wish for explanation upon any of the points referred to, either in my address or in the report, they now will have the opportunity of speaking, and I will endeavour to answer any questions to the best of my ability, so far, as I said before, as it is suitable in your own interests that I should do so.

Mr. G. HAMILTON: I should just like to ask whether the reserve which the auditor thinks should be viewed as a depreciation fund, will be available for another dividend of 5 per cent. in the event of the anticipations held out to us not being realised? I mean, if there should not be sufficient from any other source, will this fund be available for dividend, and so form the possibility of another 5 per cent.? Next, I wish to ask what are the present relations of the company with the Spanish Government in reference to our property?

Mr. J. SCHOFIELD: The Chairman has spoken of the diminished cost of extracting the copper. I should like to be informed what is the actual cost, as near as possible, of manufacturing the precipitate; also, what is the value of the iron ore delivered in this country, or rather free on board? I ask for this last information in order that we may be able to form some estimate of the profit likely to be derived from that source. Perhaps the Chairman at the same time can tell me what quantity of ore has been raised from this mountain—for I understand it is a mountain—of good hematite iron. I look upon it that this iron ore will produce something like 150,000*l.* a year profit, in addition to what we are already making—that is, if the iron turns out to be of the quality it is supposed to be, and the iron market remains in its present condition.

The Hon. H. COKE: I should liketo ask one question which is rather a delicate one to put, and perhaps rather delicate to answer. As to "Sundry Trade Debtors," I find a large increase under that item during the last year. I wish to know if any sum from last year is brought down into the present figure. How long have the present debts been outstanding? or, in short, are our debtors worth 20s in 1*l.*

The CHAIRMAN: First in regard to the question of reserve referred to by Mr. Hamilton. I cannot say that the sum above alluded to would be available for dividend; but yet it is available for a very important purpose in connection with the accounts—that is for the reduction of the original cost, and so virtually of the capital. It is also available in the event of any extraordinary outlay—any unexpected outlay—being thrown upon the company. It is perfectly open to us to to make use of that fund which is lying there, not written off against the original block, in case of any unexpected demand for any useful purpose in connection with the works. (Hear, hear.) In regard to our relations with the Spanish Government, they are of a most satisfactory character. There are really no questions open between us and the Spanish Government at the present time. (Hear, hear.) The relations between us have always been of good character. We have had contentions, no doubt; and we have fought frequently for what we conceived to be our rights—and we generally gained them. (Applause.) I am afraid Mr. Schofield's question contains a little more than I feel it right to answer There is a very handsome profit upon the production of copper; and I may explain that the cost is diminishing by a very natural process, which you will under stand when I tell you that large heaps are accumulating upon the ground which will only gradually yield their copper. The cost of placing the heaps has already been written off against the cost of last year's copper and that of the year before. Therefore, you see there is in each year a tendency to diminish the cost of copper up to a certain point, and it is diminishing at the present moment in a very satisfactory manner for the shareholders. (Applause.) The iron ore we always knew to be there; but of course, while the very low price for pig-iron to which we had been accustomed continued it was quite impossible for us to make anything of our iron ore to advantage by shipping it. Since the rise in iron we have sold trial cargoes, as I have informed you, to the extent of about 10,000 tons; but we have large contracts with several of the buyers that are conditional upon the result of their trials. We thought it was only wise and prudent, in your interest, to make such contracts. The period for the declaration of their options will soon expire; and we shall then I hope succeed in making some very good contracts. (Hear, hear.) In the first instance, we sold one or two cargoes at a merely nominal price—a little over the cost of production; but other trial cargoes we sold at 12s. 6d. per ton free on board, which gave us a good profit. The conditional contracts have been made at higher prices, the ore being deliverable over two years. (Hear, hear.) In regard to the quantity of hematite available for shipment, we have not yet so far completed our surveys as to enable us to be quite accurate in our calculations; but we have ascertained beyond doubt that in the one position from which we are now extracting hematite there are upwards of 2,000,000 tons of very good quality. (Applause.) I think Mr. Schofield's estimate of 150,000*l.* a year profit is a little sanguine. (A laugh.) To the question put by Mr. Coke, there is a most satisfactory answer. The trade balances are purely running acceptances of buyers, not one of which is overdue, for current business, and they are accounted for by the increased business in copper. (Hear, hear.) Those in question have all been paid without any exception, because the time has run out. To be perfectly honest, I should tell you that last year we made one bad debt of about 200*l.* I believe I have now answered all the questions that have been put to me; and, therefore, now ask if it is your pleasure that the report and accounts be received and adopted?

The CHAIRMAN: I have now much pleasure in proposing "That a dividend be declared at the rate of 5 per cent. per annum, or 10s. per share, for the year ending Dec. 31, 1879, payable on May 1, free of income tax."——Mr. MACANDREW: I second the motion.——Carried unanimously.

The CHAIRMAN: I have now to propose "That the board be and they are hereby authorised to issue debentures for a total amount, not exceeding 500,000*l.*, at any one time, over and above the amount of 2,000,000*l.*, for which debentures may be issued under Article 38 of the Articles of Association, upon the same terms and conditions as therein provided."——Mr. MACANDREW: I beg to second that.——Carried unanimously.

The CHAIRMAN: I have next much pleasure in moving "That the retiring directors, Mr. W. Macandrew and Mr. A. Matheson, M.P., be re-elected.——Mr. DALLAS: I beg to second the motion.——Carried unanimously.

Mr. G. T. POWELL: I beg to move "That Messrs. Turquand, Youngs, and Co., be re-elected auditors for the present year."——Mr. A PATON: I second that.——Carried unanimously.

Mr. G. HAMILTON, in proposing the next resolution said: In reviewing the past of our company, I have noted very carefully its progress and development during a period when disaster was overhelming us on all hands, and looking back through all this to the care and attention manifested for our interests by the firm of Matheson and Co., who, if I am rightly informed, provided more than a million of money when it was wanted, I cannot help feeling that but for their help this company might now have been in the position of the Glasgow Bank. When we look at the fearful amount of disaster and destruction that has occurred amongst limited liability companies, to the great strain to which they were subjected, to the depressed condition of the whole trade of the country, when we look to that, and then remember that our Chairman and his friends in those critical times came to the rescue with their own resources, we must all acknowledge that not only do their services deserve recognition but that they themselves are entitled to our hearty thanks. (Loud applause). I think, therefore, I shall only be expressing the general feeling of this meeting in proposing a cordial vote of thanks to our Chairman and his firm. (Renewed applause).——Mr. CAMERON: I second that.——Carried unanimously.

The CHAIRMAN, in acknowledging the compliment said: I can only say, gentlemen, it was a great trial to us, in common with yourselves, when year after year passed, and heavy and increasing expenditure was incurred without any apparent satisfactory result. We had two courses open to us. There were not wanting, of course, experienced counsellors who advised that we should wash our hands of the company, and leaves it to its own resources. We adopted another course, and I may say generously and liberally supported the company. (Applause.) The result has been that which we have heard described to-day. I thank Mr. Hamilton very heartily for the kind words used, and you, gentlemen, for the vote of thanks you have passed to our firm, whese members I shall take care to inform of the cordial sentiment you have expressed. (Hear, hear.)

Mr. W. D. ANDERSON: I beg to propose a hearty vote of thanks to the Chairman for his conduct in the chair this day. Most lucid as have always been his statements during the past six years, I think his address to-day has been more clear and lucid than ever. (Hear, hear.)——Mr. SWABEY: I beg to second that motion.——Carried unanimously.

The CHAIRMAN, in reply: I tender you my best thanks for the kind manner in which the vote of thanks has been proposed and carried. It is true I have given a good deal of my time to the interests of the company; and I have done so at a cost of strength of which few of you perhaps are aware. But I have reaped my reward, and the vote of thanks you have passed and the kind expressions towards me that have fallen from yourselves prove that you esteem the services I have sought to render to your company. (Applause.) Perhaps you will allow me here to mention a matter which has not been referred to before at any of these meetings; but I am sure the spareholders present will appreciate the information I now give them that the children of the numerous workpeople at Rio Tinto are not neglected, that from the first year of the company's existence excellent schools have been maintained for them without any cost to the company—schools that are now in a very flourishing condition. (Applause.) As showing how little the fact is known, I may mention that on a visit paid not long ago to Rio Tinto your deputy-chairman made the discovery of these schools, and he wrote me word expressing his satisfaction at that discovery. In these schools the Bible has been taught—(hear, hear)—and I am sure I am safe in saying that these and the other measures taken for the benefit of the workpeople have had a most excellent effect upon their conduct and character. (Applause.)

A SHAREHOLDER: Before the meeting terminates I should like to propose a vote of thanks to the staff of the company, which, it certainly must be acknowledged, has laboured most earnestly and assiduously in contributing to the success of the undertaking. (Applause.) Every one knows that without a good staff success cannot be obtained. I believe we have an extra good staff, and that it is in a great measure to their exertions that the dividend we are about to enjoy has been secured. I beg to propose a vote of thanks to the staff for the skill and assiduity with which they have conducted the operations under their charge.

M. DE CUMENGE (who, the Chairman explained, was an engineer in the service of the French Government), in seconding the motion, said: Gentlemen, excuse me if I don't address you in your own language; I am not clever enough to explain in English what I wish to say, and hope that you will pardon me if I speak French before you. Messieurs, je vous demanderai la permission de dire quelques mots en ma double qualité d'actionnaire et d'ingénieur des mines. Comme actionnaire, je me déclare satisfait du dividende annoncé, et j'espère que ce sera le premier terme d'une progression croissante. Comme ingénieur, j'ai eu la bonne fortune de visiter récemment vos magnifiques établissements, et, pour rendre hommage à la vérité, je dois déclarer que les travaux m'ont paru conçus et dirigés

avec une rare habileté par votre éminent ingénieur, Monsieur Deby. Cet ensemble de travaux peut être montré avec orgueil aux amis et aux ennemis de l'entreprise, et je me réjouis d'être au nombre des premiers. (Applause.)

The resolution was carried unanimously.

The CHAIRMAN: I shall have great pleasure in conveying to the staff the vote of thanks you have just passed.—The proceedings then terminated.

RICHMOND.—At the directors' meeting, on Tuesday, a dividend of 7s. 6d. per share, free of income tax, was declared payable on May 6. The accounts for the year ending Feb. 29 are being audited, and will be published, together with the directors' annual report, in a few days; these accounts show a large amount of undivided profits; the directors, have, however, only declared the usual dividend of 7s. 6d. per share, but they will recommend another division after the meeting, which will be held as early as possible in May. The shareholders will have noticed with satisfaction that for some time past the mine has been opening out splendidly. There are now several very large bodies of ore in sight, and connections in ore have been made from the top of the 15th chamber down to the 600 level, a distance on the incline of 500 ft.; chambers Nos. 11, 12, 13, 14, and 15 are all connected, also in ore all the way, and the extent of the reserves, which no one can compute with certainty, is increasing every day. The furnaces, refinery, and machinery are all in good working order.

PANULCILLO COPPER COMPANY.

The directors have given notice that the coupons due June 1 and also those due Dec. 1 next may now or at any intermediate time be presented at the Consolidated Bank (Limited) for payment under discount at the Bank minimum rate on the day of presentation. The accounts for the six months ended Dec. 31 indicate that the operations at Panulcillo in the first half of the financial year have resulted in a profit of 15,862*l.* 7s. 5d., or, after deduction of interest payable here on debentures and London charges for the half-year, a net profit of 12,778*l.* 5s. 7d. It appears that 2733 tons of regulus, containing by analyses about 1333 tons of pure copper, were produced at Panulcillo in the six months ending Dec. 31 last. The average realised price was $17·34 per quintal metrico.

After reporting upon the various points of operation, Mr. F. G. Welch states that during the half-year the average rate of wages (about 1s. 2d. per metric quintal) has been maintained, as with the enlistment of volunteers for the army, and also the attraction of high copper prices tempting men to go mining on their own account, the inducement of fair wages had to remain unaltered; otherwise they might have suffered from a loss of hands during the busiest time of the year. This year there has been a slight reduction in the miners' wages, but not in those of the outside workmen; it was attempted with the latter, but found impracticable at present. The general rate of wages paid to miners in this "mineral" compared with that of others near us show a difference in favour of the company, and until present circumstances change it will, he thinks, be premature to alter it. With regard to the reserves, he states that with the exception of Nos. 5, 8, 9, and 10 exploration labores, none of them have discovered new ore bearing ground to value; and even the above labores, although exploring in lodey ground to value, are not yet of sufficient extent and depth to warrant the estimation of any greater reserves than those stated in his report for the half-year ended June, 1879. In recapitulating, he mentions that of new ground opened out for roadways and explorations only 169·10 metres have been driven. More than this was not put in hand, in consequence of the unfinished state of the San Gregorio adit and canchas. These works, however, being now completed and in good working order, he would impress upon the board the absolute necessity of putting more exploration work in hand, if the thorough efficiency and working condition of the mine in the future is to be considered. Judging from the character of the lode, and the condition of the exploration labores other than those enumerated in the above remarks in various parts of the mine, which were suspended during 1879, he fully considers that from 12 to 15 labores ought to be in hand, so as to be prepared with new slopes on the exhaustion of the present reserves. The amount of wages costs per metric quintal of ore was slightly under my estimate, owing, as shown on page 4, to improved production and less exploration costs.

Reserves he cannot estimate at a higher figure than 800,000 metric quintals, in consequence of some of the explored ground not having proved lode to value. As before stated, those few labores sinking below present reserves are not sufficiently forward to justify any calculations being based thereon. By end of current year he is, however, very sanguine that considerable new pay ground can be opened up and put to reserve account. Judging from the delivery of ores during the past two months he anticipates a monthly production of from 40,000 to 45,000 metric quintals at 5 to 6 per cent., at a wages cost of about 25 cents per metric quintal. Copper produce is estimated on that of last month's production, which gave 5½ per cent. Wages cost per quintal of ore is based upon the economy of delivering nearly the whole of the mine produce by the San Gregorio adit level to the new canchas, the full benefit of which can hardly as yet be realised.

NERBUDDA COAL AND IRON COMPANY

The report of the directors, prepared for presentation at the meeting on May 4, states that although the operations of the past year have not proved so satisfactory as expected, they are of opinion that the manager's explanations will greatly reassure the shareholders as to the future. The output of coal for 1879 was 13,401 tons, of which 10,617 tons were sold and 2873 tons used for colliery purposes. As the latter appears somewhat excessive when compared with the entire raisings, the manager has been asked for an explanation. The output from Jan. 1 to Feb. 29 of the present year was 3149 tons, against 1739 tons for the corresponding period of last year. The entire raisings for March have not yet been received, but the deliveries (coal sales) to the 20th were 1141 tons, against 690 tons to the like date for 1879. Particular attention is directed to the new pit—the Georgina. In July last a bore-hole was started about 600 ft. from the No. 1 shaft, which Mr. Maughan was of opinion would prove the coal at a depth of from 200 to 300 ft., but after boring to a depth of over 60 ft. he decided, for reasons mentioned in his report, and which the directors think satisfactory, to discontinue the boring, and proceed at once with the sinking of a shaft; meanwhile further operations at the new winning will be suspended.

Mr. Maughan states that he commenced this pit 12 ft. diameter inside—that is 12 ft. within the walling. Up to Jan. 31 the pit was down 40 ft., and close cribbed and dealed. He hopes to get all the cribs out and the necessary walling in before the rains, so as to have as little water to contend with as possible. He will need no new machinery for this pit, and estimates that he can complete the sinking and shaft arrangements down to a depth of 250 ft. for Rs. 20,000. He intends placing one of the Robey engines here to both pump and wind. It will be gratifying to the shareholders to learn that so large an area of coal can be worked from the new pit, and it may fairly be assumed that when the coal is once opened out no fear as to the future need be entertained. The directors deemed it preferable to make a call for the purpose of capital work rather than defray the cost out of revenue, and thus prevent a possible dividend in the current year. The call has been promptly responded to, by which means, with the exception of the 3000*l.* debentures, all liabilities in respect of loans have been discharged, and an available surplus of nearly 2500*l.* remains.

With reference to the Birhman Copper Mine all operations have for a time, if not absolutely, been abandoned, as Mr. Maughan sees nothing sufficient to justify him to recommend further outlay. The entire expenditure to Dec. 31 since May, 1874, has been 1269*l.* 0s. 1d., from which, however, must be deducted the proceeds of the sale of the ore sent to England, amounting to 630*l.* 1s. 1d., leaving a loss of 638*l.* 19s., which has been charged to mine properties. The accounts exhibit a loss of 513*l.* 11s. 10d., which, however, is much increased by the debenture and other interest, amounting to 282*l.* 1s. The expenditure against the new winning and Georgina Pit will be until coal has been raised in the respective workings considered a capital charge, and treated accordingly.

ROMAN GRAVELS MINING COMPANY.

The directors' report, prepared for presentation at the meeting on Wednesday next, states that the sales of lead for the year ended Feb. 28 were 2479 tons, realising 25,730*l.* 4s.; and of blende, 120 tons, 475*l.* 5s.: together, 26,205*l.* 9s. This is inclusive of 400 tons of lead ore, for which credit was taken in the last account, being then dressed and marketable. The expenditure for the same period for labour, materials, royalty, purchase of engines for the new shaft, rates, and other charges, together with the estimated value of the 400 tons of ore before mentioned, has amounted to 21,854*l.* 8s. 6d., leaving a disposable profit (inclusive of 4310*l.* 17s. 2d. brought from the account ending February, 1879) of 8661*l.* 17s. 8d., from which two dividends have been paid, amounting with income tax to 6125*l.*, the balance of 2536*l.* 17s 9d. to be carried to profit and loss new account. An additional 400 tons of lead ore and 25 tons of blende have since been sold, and a further dividend of 3000*l.* (not included in the balance-sheet), payable on April 21, has since been declared.

Capt. Arthur Waters (April 20) writes that the reports sent to the secretary, and published weekly in the *Mining Journal*, will have kept the shareholders informed as to the state and progressive condition of the mine throughout the last financial year, and he now submits an epitome of the whole, which shows clearly the present extent of the workings, and the length of the ore deposits on the great Roman lode. Their stocks of ore on the stulls underground are estimated at about 700 tons. Should the price of lead ore advance to 13*l.* or 14*l.* per ton they will do their best to push the returns, so as to be able to give the shareholders larger dividends in the future. They have considerable reserves of ore ground in the mine, and, if needs be, the staff could be increased, and the output enlarged accordingly. Still he considers it would be undesirable to work faster than they are doing with present prices for lead ore. He will attend the general meeting to answer questions as well as explain by the section of the workings what may then be considered necessary for the further enlightenment of the shareholders.

TAMBRACHEERY COFFEE ESTATE COMPANY.—The report of the directors, prepared for presentation at the meeting on May 12, states that a committee has been appointed to endeavour to effect an amicable settlement of the dispute as to the acreage of the property sold to the company, which might otherwise drift into protracted and expensive litigation. Referring to the Mr. R. Brough Smyth's report on the Wynaad district, the directors state that it appears that an area of about 500 square miles, in which the property of the company is included, contains auriferous quartz in abundance, and the board have recently been advised of the discovery of an important reef on the Charlotte estate, in addition to the reef already noticed on the Adelaide estate. The directors consider the matter has now assumed sufficient importance to warrant further investigation, and they have accordingly entered into arrangements with an experienced mining engineer, about to proceed to the district, to examine and report on the company's property from a mining point of view. In the meantime, without indulging in over sanguine views, the directors may remind the shareholders that the company's estates form the largest private property in the Wynaad district, and if the favourable expectations entertained by the different gold companies which have been started should be even approximately realised the mineral value of this company's lands will be very considerable. The directors, however, are of opinion that only practical test of treating a large quantity of quartz by the most improved machinery can afford the requisite clue to the real value of the recent discoveries; and they consider it wiser to wait the result of some of the operations in progress before proceeding further than prospecting and opening out the reefs previously mentioned, for a thorough examination. The shareholders will be invited to sanction the expenditure of a sum not exceeding 500*l.* for this purpose. Under the Articles of Association the company has no power to work the mines or lease mining rights, and to enable it to do either the board are advised that a formal winding-up and reconstruction will be necessary.

[For remainder of Meetings, see to-day's Journal.]

SHORT NOTICES ON IRISH MINES.

BY WILLIAM THOMAS.

The Townland of Rossbrin intervenes between Kilbronogue and Ballycummisk Mine, which is to the east of Rossbrin, and situated in the side of a hill a short distance from Rossbrin harbour, where vessels can load and discharge their cargoes. One of the lodes of this sett was selected for trial some years ago, which near the surface contained strong yellow copper ore, blende, iron, quartz, and considerable quantities of impure barytes. It seems clear from the character and quality of the ore raised from this great lode that it is not the Cappagh or Coosheen lode, which produces ore entirely different, and of much richer quality. All the lodes, however, of those mines run through Ballycummisk. There was an absurd notion entertained some time ago by certain authorities, with as much reason as transforming the clay-slate of the district into red sandstone, that because the lodes in West Cork produced ore near the surface it could not be lasting in depth, and the late proprietor of Ballycummisk Mine, in order to solve this problem, confined the operations principally to sinking until he reached a depth of about 220 fms., and the lode is still continuously large and productive, and nearly free of the impurities it contained near the surface. The sales of ore amounted to over 50,000*l.* As before remarked, the great belt of lodes of the district passes through this sett, also caunter lodes, flookans, &c. A cross-cut north and south from the adit level would no doubt make important discoveries in intersecting the parallel lodes.

Cappagh Mine is to the east of Ballycummisk, but between the two mines there is an intervening run of unexplored mineral ground about ¾ mile in length on the run of the lodes. This mineral range is about 30 fms. high above the sea level, and embraces all the great lodes of the district, and a cross-cut north from Rossbrin harbour to intersect all these lodes in virgin ground would be a capital speculation. A boring machine would soon lay open important discoveries. Cappagh Mine has had the name of being worked for the last 60 years or more, and at short intervals of working produced ore of the value of about 60,000*l.* Two of the lodes near surface contain splendid gossan, and at and about the 14 fm. level from surface remarkably fine specimens of malachite were found. It is a singular fact that the ore in Cappagh Mine, and Coosheen Mine, though four miles from each other, is of precisely the same character, appearance, and quality. Cappagh is 120 fms. deep from surface. I superintended sinking the shaft on the course of the lode the last 20 fms., and raised ore of the value of 1650*l.* The last parcel—crushed dry—gave 17¾ per cent. The lode in the bottom of the mine will produce 2 tons of rich copper ore per fathom. The two great lodes are nearly joined in the bottom level, and a caunter silver vein intersects the main lodes near the skip-shaft. There is a first-class pumping-engine, 56-in. cylinder, 9-ft. stroke, on the mine, pitwork fixed, skip-roads to the bottom of the shaft, steam whim for hauling and crusher attached, houses, yards, &c. Audley Cove—a convenient place, with quays, &c.—is close by for shipping produce and hauling supplies. The owners of Rossbrin, Ballycummisk, Intermediate Sett, and Cappagh Mines are Mr. and Mrs. McCarthy Collins. A party now taking up Cappagh Mine, with all the valuable machinery fixed and in proper position, and taking advantage of all previous outlay and available work done, would not only reap the benefit thereof without cost, but no doubt realise handsome profits in sinking and extending the bottom levels.

REPORT FROM CORNWALL.

April 29.—It shows very plainly what the real opinion of mining men is about the recent changes in the tin market that the heavy drop in the standards of 4s. announced on Monday had very little effect upon the local share markets, except in the restriction of business. Holders prefer to hold to being beat down by the results of "gambling" operations on the London metal market—recent action has got beyond the fair use of the term "speculative"—while every indication points the other way. There is no question that stocks are decreasing, demand advancing, and supplies falling off; and yet in the face of all the improvement that has taken place since the year opened we are worse off now than we were then. It is not possible for matters to go on much longer as they are without some effort being made to break down this injurious action, which inclines one to believe that our ancestors, in the heavy penalties they levied against "forestalling" and "engrossing," were not so very far wrong after all. But we have very little hope of any such effort being successful. Whatever may be said of the ticketing system of sale what can be advanced in defence of that at present in vogue, under which the smelters declined to name a price until Monday for the black tin brought there on the previous Saturday. The plain truth is that there is no cohesion whatever in the county. The smelters only work together in a half-hearted way, whereas they are still strong enough if they were really combined to be able to defeat the nefarious motives of the London "bears." They are practically united only against the miners—at any rate at the present juncture. A certain remedy would be for several of the leading mines to resolve to "stock" for a time, and drive the speculators into a corner; but then, again, there is not the slighest prospect of joint action. All there seems open to us is, therefore, simply to trust to the course of events, under which in the long run the laws of demand and supply must rule.

We are not quite sure how far it is proposed to go, and whether the movement is meant to cover more ground than that indicated the other day by Mr. Redgrave; but it is intended to take steps to introduce a series of special rules under existing legislation for the management of mines in the West. Dr. Forster for this purpose has convened a meeting of mine managers and agents to have the whole matter fully discussed. It is to be hoped that there will be a full attendance and a free interchange of sentiments. There is everything to gain, and nothing to lose by the fullest ventilation of the whole question, though we do not anticipate that the special needs of operative mining as practised in the counties of Cornwall and Devon, so far as the action of the Factory Act is concerned, can in any way be adequately met without fresh and careful legislation.

The Miners' Association has just received the first year's payment of 100 guineas from the City and Guild of the London Institute in support of its proposed extensions. The Institute promises this amount annually for three years certain. There is no little room for criticism in many of the remarks made at the recent discussion of the Mining Institute on Mr. Twite's paper (fully reported in last week's Journal). If there is one thing which the Miners' Association has steadily kept in view more than another it has been the combination of the theoretic with the practical; and there can be no better proof of this than the recent institution of the Association medal, which can only be won by miners proper, and which is the highest honour the Association has in its power to bestow. It is strange that in the present day there should still be so much jealousy of technical training, and such a preference for that information which a few specially gifted men may pick up here and there haphazard. Though Dr. Foster, and those who took his view of the question, were rather guarded in their remarks, it is no secret that Cornwall—though her miners are the best in the world—has always been very slow to adopt improvements. With a wider-spread scientific as well as practical training—and both must be present if the training a man receives is to be in any way really worthy the name of "technical"—the West of England would have reaped the advantages of boring machinery (the latest illustration that occurs to us) years ago. While foreign nations are getting ahead of us in so many manufacturing directions by the superior training which they give to their workmen, mining cannot be suffered to lag behind; and the work of the Miners' Association is absolutely indispensable to our present and future progress.

A well-merited honour has been conferred upon Mr. R. Boyns, of the Bank, St. Just, by the presentation of a handsome and valuable épergne, in recognition of his untiring and indeed Herculean efforts while depression was at its worst to keep alive mining in the St. Just district. Mr. Boyns is one of the most plucky mining men that the old county has, and by his perseverance and tact he has contrived to carry through every work of importance to which he has really set his hand. The movement was initiated at St. Just, which it is not too much to say Mr. Boyns rescued from almost total ruin, and was heartily taken up down West. The presentation was made by Sir John St. Aubyn, who said that by the large attendance it was shown that the movement had the entire sympathy of the parish of St. Just. Mr. Boyns had never lost heart during the whole of the depression, had got outsiders to take up the shares which local men could not hold, had kept old mines going and started others, and thus provided labour in the parish, and kept their best miners from being obliged to go out of the county. Mr. Borlase, M.P., also took part in the proceedings, which were of the most enthusiastic and gratifying character.

The difficulty at Devon Consols—it was never worth while calling it a strike—has come to an end almost as soon as it arose. It never ought to have had any beginning. Men should remember that although labour is more in request than it was that there may be more ups and downs yet in store, and that the wisest, as it is, indeed, the only honest, course is to carry on their work with a full sense of their responsibility to their employers, and their duty to themselves and those dependent upon them.

Lead mines are attracting some attention, and Shepherds' Mine is mentioned as likely to be worked, the difficulties in the way having been removed. Operations have also been begun upon the Bicton estate, near Liskeard, where there are silver-lead and manganese, and also copper lodes, and where a prosperous mine is much wanted.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

April 29.—Since last week the impression prevailing amongst traders in South Staffordshire that there must shortly be a further declared reduction in the price of coal by Mr. E. Fisher Smith, the agent of the Earl of Dudley, and Chairman of the Coalmasters' Association, has increased. At the meetings of the trade yesterday and to-day ironmasters were basing their acceptance of contracts upon the assumption that such a reduction is imminent. The extent of the alteration, it was assumed, will be 1s. per ton on furnace coal, leaving it at 9s. It would carry with it a decrease in colliers' wages of 3d. and 1½d. "per day," or stint, in the thick and thin seams respectively.

Pig-iron makers report a continuance of the attempts by buyers to stave off deliveries, and a marked reluctance by purchasers to place new contracts. It is believed that taking the district through a total of six furnaces have been blown out during April. All mine pigs are abundant at 4*l.* 5s. to 4*l.*, and cinder pigs at 2*l.* 10s. to 2*l.* 7s. 6d. High-class Welsh pigs are priced at 4*l.* 15s. to 4*l.* 10s., delivered hereabouts. Finished iron remains quiet, but further United States orders are anticipated before very long. Common sheets (singles) are selling at 9*l.* to 8*l.* 10s. as a minimum.

The Hamstead Colliery Company's annual report states that the Thick Coal seam lately discovered has now been sunk through, and if found to be 24 ft. thick, and of a good quality, with a dip of 1 in 16 to the south-east. To complete the second shaft for the erection of permanent plant, opening out workings, &c., a sum of 50,000*l.* will be needed, and a further 20,000*l.* will be required in 1882 for the payment then to be made on "purchase account." To provide for these requirements the directors propose for the present to raise 60,000*l.* by the issue of remainder of the unallotted capital—3000 shares of 20*l.* each.

The arbitrators under the South Staffordshire Mines Drainage Acts have given notice of their intention to hold a public meeting on May 8, when they will propose to make a draft mines drainage award for the Tipton district. The rate required is estimated by the arbitrators at 3d. per ton on fire-clay and limestone, and 6d. per ton on ironstone, coal, slack, and other minerals. The rate will continue in force for one year.

The Coroner's enquiry as to the explosion in the Fair Lady pit, Leycett, North Staffordshire, on Jan. 21 last, when 62 men and boys lost their lives, was concluded on Wednesday. Mr. Sawyer, assistant Government Mine Inspector, expressed the opinion that the explosion was caused by an overcharge shot firing gas and coal dust, of which latter there was a very large quantity suspended in the air. Mr. Sawyer condemned the use of gunpowder in fiery mines, and the same view was strongly expressed by Mr. Wynne, the Government Inspector for the North Staffordshire district, and Mr. Evans, the Government Inspector for the Midland district. The Coroner said it was a farce to insist upon the use of safety-lamps and the adoption of other precautions in mines as long as blasting was allowed. The jury found a verdict that no one was to blame for the explosion, and they recommended that blasting should be abolished altogether in fiery mines while men were at work, and that the system of Government inspection should be made more stringent.

Messrs. E. P. and W. Baldwin, tin-plate manufacturers of Wilden Ironworks, Stourport, have been awarded a gold medal at the Sydney Exhibition.

REPORT FROM LINCOLNSHIRE.

April 30.—The Lincolnshire ironstone field, the most recently discovered, from its somewhat isolated position has less said about it than many of far less importance, although it contains a practically inexhaustible supply of stone. During the greater part of last year business was comparatively quiet, but the Frodingham district in particular has participated in the improvement which has characterised the Iron Trade in all parts of the kingdom, and there are now more furnaces in blast than there have been for a long time past. There has also been more doing in ironstone for other districts, so that Lincolnshire now stands fifth amongst the counties producing iron ore. Of late the Manchester, Sheffield and Lincolnshire Railway has taken a vast quantity into different parts of the West Riding as well as to other parts of the country. The largest quantity has been sent from Frodingham, where the stone is obtained close to the surface on the estate of Mr. Rowland Winn. Great care, however, is necessary in selecting it, owing to the quantity of lime contained in some places, some samples giving as much as 9·46 per cent. So much trouble has the excess of lime given that it has been found advantageous to mix with it a certain proportion of stone from other parts of the country, in some instances to the extent of from one-eighth to a quarter. Stone from Lincoln is consequently being used, as it contains less than 2 per cent. of lime. Nearly two-thirds of the stone raised is used at the works on the spot, the remainder being sent away by railway. At Trent the works were started by the Messrs. Dawes, who built seven furnaces; but the place now belongs to the representatives of the late Mr. W. H. Dawes, and the quantity of ore raised in connection with the area of ground leased has been at the rate of nearly 3000 tons a week. It was in this field that the ore was first raised, and that by the Messrs. Dawes, in 1860, under whose notice it was brought by Mr. J. Rosely, the agent for Mr. Winn, and who in the following year commenced a railway from the River Trent to the out-crop of the bed, for the purpose of shipment. The Frodingham Company, which commenced operations in 1866, have also been raising a large tonnage of stone in the same locality, and the same has been the case with the North Lincolnshire Company, who have two furnaces. In what are known as the Glebe lands the Staveley Company have been obtaining stone close to the Frodingham station. Messrs. Cook and Sons (Limited), at Crosby, have

been working the ore for the furnaces near Sheffield. There has, however, been a good demand for the stone raised at Greetwell and Monk's Abbey, near to Lincoln, where the stone was rich in metallic iron and with only a comparatively small quantity of lime, the output having been at the rate of upwards of] 2000 tons a week. Some good stone is also raised at a place called Saxby, near Market Rasen, for the use of the furnaces belonging to the West Yorkshire Iron and Coal Company, who have extensive works near Leeds. A heavy tonnage of this has been sent away, but not so much as formerly, to the company's furnaces, which are not all now in blast. There has been a marked increase of late in the production of pig in the Frodingham district, furnaces being put in blast which had been out for a considerable time. The Redbourne Hill Iron and Coal Company, who built two furnaces in 1872, had them out for two or three years, but the advance in the price of iron and general improvement in the trade, which commenced towards the close of last year, led to both being put in blast. The North Lincolnshire Company have also two in blast, the Frodingham Company three, and the Appleby Company two, so that there will be about 13 furnaces in blast, and the production will now be at the rate of upwards of 12,000 tons of pig a month. The pig has been in good request for foundry and other purposes. A good deal is in demand for forgings as well as bars, sheets, and wires. Clay, it may be said, is used in some instances to lessen the trouble resulting from the excess of lime, and there is an abundant supply to be obtained from a bed in close proximity to the furnaces. The Santon clay contains 50·10 of silica, alumina 22·72, and peroxide of iron 6·78 per cent. A good deal of the fuel used in the furnaces is now obtained from South Yorkshire, which is at a comparatively easy distance, there being direct railway communication to the very centre of the coal field. The consumption of coal at the furnaces averages something like 30 cwts. to the ton of pig made

REPORT FROM MONMOUTHSHIRE AND SOUTH WALES.

April 29.—During the past few days the death of Mr. John Griffiths, the contractor for the Alexandra Dock, Newport, has occurred. He was interred yesterday at the new cemetery, Newport, among those present being Sir George Elliot, Bart., Vice-chairman of the Dock Company, Mr. J. C. Parkison, managing director, Mr. H. Russell Evans, J.P., Mayor of Newport, and others.

At the Merthyr Police Court yesterday a somewhat extraordinary wages claim was made by a collier named James Roach, against the Dowlais Company. The complainant had alleged that there was defective ventillation, but no other collier left at the time, and also that he was ill. He likewise said that there was a want of rails. At one time when he was absent it was proved that he was attending meetings of working men at Dowlais. The Stipendiary characterised the claim as a most unfounded one, and dismissed the summons. A case having reference to a late colliery explosion in the Rhondda Valley has been heard at Pontypridd, Jabez Watkins, manager of the Glynfach Colliery, has been summoned under the Mines Regulation Act, on three counts, charging him with allowing naked lights to be used, and neglecting other duties which a manager should perform on an explosion happening. The Bench fined defendant 15*l.* and costs for the three offences alleged.

Messrs. Evans Evans and Christmas Evans, owners of the Dinas Main Colliery, have been fined 5*l.* and costs for an offence under the Truck Act. Three other cases were withdrawn on the payment of the costs.

The Iron Trade of the district has not materially altered since last report. There is undoubtedly not so much doing on American account, but large shipments are continually being made to the United States. The main thing is to be assured that the vacanies which will shortly be left in masters' books may be filled up. There is undoubtedly a better demand on colonial account, and there are Indian requirements. Probably, too, now we shall see the home trade revive a bit. A visit to the various docks is now more interesting from a mercantile aspect than it was some few months ago. The works mostly seem busily employed, and one seems puzzled to know where all the trade comes from after the lugubrious moanings as to the American demand falling off. The fact is, trade generally has improved, and South Wales is reaping the benefit. Prices for finished iron have not materially altered at the works. Quotations for pig-iron have gone down still lower, and for old rails, &c., they fluctuate much.

If one comes to the Tin-Plate Trade it is apparent that the demand is not quite so good, but prices are about the usual. The works are tolerably well employed.

The Coal Industry has been as active as usual during the past few days. The demand has continued very good, and shipments, especially on foreign account, have been fully up to the average. The demand for steam qualities has been remarkably good, and some fair orders have been entered into, but mostly for immediate requirements. There is not the least change to note in prices, which are, however, firm. In the house coal department there is little or no change to note, but the demand seems rather slack. Anthracite coal is in rather better request. In the Caerphilly district trade is somewhat more lively. The patent fuel trade seems to be reviving a little. Coke is unchanged.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

April 28.—It is with sincere regret that I announce the resignation by Mr. T. Fanning Evans of the office of H.M.'s Inspector of Mines for North Wales, Cardigan, Radnor, and the Isle of Man. Mr. Evans has held this office since the passing of the Metalliferous Mines Act. I am sure that I speak the sentiments of the whole of the mining men of Mr. Evans' district when I say that they cherish a very high estimate of the ability, courtesy, and fairness with which he has discharged the duties of his office; duties that are always onerous, and often difficult and painful to perform. It will be also right to place on record in these pages the following letter expressive of the sense entertained by the late Home Secretary concerning Mr. Evans' performance of his duties:—

Whitehall, April 14, 1880.

SIR,—I am directed by the Secretary of State to acknowledge the receipt of your letter of the 10th inst., stating that it is your intention to retire from the office of Inspector of Metalliferous Mines at the expiration of two months, and I am to acquaint you that the Secretary of State is pleased to accept your resignation. I am at the same time to express to you Mr. Cross's sense of the efficient manner in which you have discharged your duties throughout the time that you have held office. (Signed) GODFREY LUSHINGTON.

T. F. Evans, Esq., Inspector of Metalliferous Mines.

It is not as yet known who Mr. Evans's successor will be, but we hope that whoever he may be he will stand as well in the district as Mr. Evans does. The best wishes of the readers of the *Mining Journal* in this district, I am sure, will go with Mr. Evans on his retirement from office.

Reference has been made in these reports to the quarries of stone and slate that lie along the course of the Portmadoc and Gorsedda Junction Railway. I am pleased to see a revival of interest in these quarries. I have before me the prospectus of the Tremadoc Stone and Paving Sett Company. This company is formed to work the Queen Stone Quarries, and the step will, I hope, be a successful one forward in the working of the valuable syenitic greenstone, or, in popular language, "granite," that lies in the cliffs overlooking the town of Portmadoc to the north-east. Mr. Stutchbury, C.E., of Bristol, who has developed these quarries single-handed, deserves the support he asks to work them on a scale commensurate with their worth. Then operations are being resumed at the Prince of Wales Slate Quarry, near the termination of the line, which will, I hope, reward those who are undertaking them. A lower level, which had been driven a great distance, is to be completed, and an opening made into the quarry. Negotiations also, as I am informed, are in progress in reference to the large slate quarry of Gorsedda, which has been idle for some years, but which has great capabilities.

Passing to the north-east I notice the prospectus of the Clogwyn-y-Gwyn Slate Quarry, near Rhyddu. It is a pity when a property is sufficiently and intrinsically good to give it qualifications it does not possess, and I am, therefore, sorry to see this quarry described as on the "well-known Bangor vein." I hold myself ready to eat all the Bangor vein found *in situ* there. Mr. Wm. Davies and Mr. William Roberts know better than to describe it as such, and there is no excuse now for the ignorance that once prevailed concerning the slate beds of Wales.

Turning to the little slate and lead mining district of Llangynog, in the north-east of Montgomeryshire, the production of slates from the "Old" or "Rhewarth Quarry" has been very small since the quarry changed hands, and the traction engines were *magistrated* off the road. The inhabitants are consequently suffering great poverty, which is heightened by the increased cost of living. The road wardens are now reaping the result of the metalling and rolling the traction engines caused and gave, and the result is a harder and better road than there has ever been in the district. Several trials for slate quarries are being made around the village, and there is a probability of the old Glan-yr-Afon Quarry being re-started. Renewed operations on a better scale are also spoken of as about to be commenced at the New Llangynog Lead Mine, or, as it is locally known, the "Old Mine," which I hope may be the case; but what the district wants to make it what it is capable of becoming—a first-rate slate quarrying and mining district—is a railroad of some gauge or other. A narrow gauge would do. If I possessed the means I would make this line myself.

It must be rather tantalising to the shareholders in the Llanrwst Lead Mine, that with 23,000*l.* worth of ore in sight they cannot get 1000*l.* worth away profitably to provide the little money they want. We hardly expected such a result from the reports of two years ago.

REPORT FROM DERBYSHIRE AND YORKSHIRE.

April 29.—There has been no material change in the state of trade since my last notice either as regards mining or manufacturing. There has been an average production of pig at the various works, but the demand for it has been anything but brisk, as purchasers hold back, anticipating a still further reduction, seeing that the markets are in an unsettled state. The consequence is that stocks have begun to increase, although there has been no decline with respect to the local consumption. In manufactured iron a steady business is being done at the works in the Chesterfield district as well as at those along the Erewash Valley. Excepting in connection with the Butterley Company's works there are few mills in the county of Derby, and these have been kept fairly going in bars and other qualities of rolled iron. Foundry material continues in steady request, and some good orders are said to be in hand for mining machinery at one of the principal establishments. In steel rails there does not appear to be any change whatever, the usual quantity being produced at the works at Dronfield. The collieries are not working so well as they did, there having been a marked decline in the business doing in house coal, a much less quantity than usual having of late been forwarded to the Metropolis, as well as to most other markets, whilst no improvement can be looked forward to, but rather the reverse, for the summer must lead to the consumption being even less than what it now is. Steam coal has been going off rather better, whilst there is about an average export by railway of engine fuel. Makers of coke have had little to complain of for some time, seeing that there has been a steady demand for it, a good deal being sent to Sheffield and the district around it.

In Sheffield trade continues much the same as it has been for several weeks past, excepting, perhaps, that pig does not go off so well as it did, for consumers merely buy to meet immediate requirements. The fall which has taken place naturally enough leads the trade to believe that the price must be lower than what it is, and as stocks go on increasing this is certainly likely te be the case. At the leading works there is still considerable activity, and the mills are turning out large quantities of sheets, plates, bars, and other qualities of rolled iron. Composite plates are also being extensively produced for our own and other Governments, and it is not unlikely that some good orders for them will be received from France, one of our companies having sent a plate there to be tested along with those made by French firms, and there is every reason to believe that the English plates will hold their own against all others, as they have hitherto done. In Bessemer rails there has been no decline in the activity which has characterised this important branch for several months past, and the same may be said with respect to tyres, axles, and every description of railway material. Crucible steel is in better request, and prices of it are well maintained. Steel plates are now being extensively turned out, so that the mills at the various works have so many orders on hand for rolled material that they have to run night and day. The cutlery branches are kept steadily going both on home account and for exportation. Engineers and machinists are now working well, whilst file-makers of late have been in receipt of some good orders from the Continent.

The coal trade of South Yorkshire is still in anything but a healthy state, the pits working full time, whilst prices are such as to leave no profit to the colliery proprietors. House coal has declined considerably of late, and of course will be worse during the summer months. Less is being done with the Metropolis, whilst the Great Northern as yet has not reduced the rate to London, which it was expected the directors would do. Steam coal goes off well, but as the sale of it involves the getting of the household qualities and stacking them the owners actually do less in the former than they could do were there markets for the "softs." A good deal of coke is being produced, which sells freely, a large proportion being sent to Sheffield as well as to North Lincolnshire for the use of the furnaces.

The Midland Counties Miners' Permanent Relief Fund Friendly Society has removed its chief office to Chesterfield. The secretary has been instructed to join the committee proposed by Lord Lindsay at the Manchester conference held in January last to deal with distress caused by mining operations throughout England, to confer on subjects of mutual interest to permanent relief funds, and especially on the application to these societies of the Friendly Societies Act, 1875-76, and the Treasury regulations issued thereunder.

REPORT FROM THE FOREST OF DEAN.

April 29.—The most prominent matter in the Forest just now is the distress prevalent in West Dean, but let us hope that the general commercial improvement which all are looking forward to will soon place the workmen of that district in a better position. The coal trade is much as it was at the time of our last report; a few somewhat benefited by the stoppage of the Fancy Colliery, whilst at some trade is very slack. The local forges, too, and tin-plate works have been feeling the effects of reaction, or downward tendencies of prices, though at present work is continued, and men are hopeful that improvement will return. Smelting iron ore is likely to be reduced on account of the accumulation of pig at Cinderford Ironwork. In fact, numbers of the workmen are under notice, which will termiuate at the end of the present week, the Messrs. Crawshay having decided to blow out one (if not two) of their furnaces. This will lead to more pinch and suffering Nor is there, we fear, any near prospect of Parkend or Sewdley furnaces being put in active operation, as the company nominally owning them appears to be surrounded with serious obstacles; at all events under-current rumours are to that effect, though of course rumours are not always trustworthy guides. It is certain, however, that there are few indications of commercial life in connection with those works at present.

The Severn and Wye Railway Company is about to slightly extend its accommodation, by laying a siding on to the East Slade Colliery tip, and to Mr. Chivers's Tin-plate Works. The Bilson platform of the Severn and Wye system is only about a quarter of a mile or so off the tinworks, and it is said that the Great Western Company charged the Severn and Wye Company 2s. 6d. per ton over that short distance, which of course was intended to retain all carriage to and from the tinworks in the hands of the Great Western Company. Mr. Chivers can get his goods hauled in carts over the distance for a shilling a ton. Now, however, the excessive charge is likely to be moderated by the Severn and Wye laying rails back way, so to speak, on the old tramway from their line at Miry Stock, so that commercial protection, in this instance (as it has in many others), is likely to defeat itself; whereas, it is probable that a moderate or reasonable rate would have left the Great Western in possession of the traffic. The Whinsey and Mitcheldean Road line is not likely to be opened until the alteration in the gradients has been legalised by Parliament, although the rails are complete throughout; of course we mean opened for passenger traffic, as minerals or goods are allowable now. If the company would extend that line close to Cinderford they could do most of the passenger traffic, as the Severn and Wye station is too far off the place to be very convenient, and the line too roundabout for travellers, except in the direction of South Wales or the City of Bristol.

TRADE OF THE TYNE AND WEAR.

April 28.—The general trade of the district has been extremely quiet during the week, a crisis is being passed through, caused it is supposed by overspeculation in the first two months of the present year mainly. The increased demand for coal from the improvement in the Iron Trade has not as yet caused any large increase in its average value. In Durham the rise in the price up to the end of March was little more than 1d. per ton above the rate in November; in Northumberland it was less. In Cumberland the increase is comparatively large, being rather more than 8d. per ton above that of eight months ago. This has no doubt been caused by the great increase in the demand for hematite ore and iron manufactured from this valuable ore. Of course the rise in the price of coal has been checked by the reopening of collieries closed during the late depression. The men have, however, reaped much advantage from the increased demand for coal and coke not in increased rates, but they have generally met with regular employment. The London coal trade has improved considerably lately, and the gloomy anticipations held even by many of great experience have not been realised. Prices certainly continue to be low, but the demand is steady, and the tendency is gradually towards more actively. The prices current are—Hetton Wallsend, 16s.; Lambton, 15s. 6d.; Original Hartlepool, 16s.; Chelton Tees, 15s. 6d.; &c.

Some experiments of importance have been made with English and German coal in Germany, which are expected to influence the demand for the gas coal of the Tyne and Wear. The managers of the German gasworks at Thorn and Sterburg have been testing English coal against German. The results are that a given quantity of gas obtained from Silesian coal cost 21·86 cents, from coal half Silesian and half English 20·21 cents, and from wholly English coal the cost was 12·86 cents, whilst there is proved to be an additional advantage in the coke from the English coal. This result can hardly fail to improve the position of the gas coal produced in such large quantities in this district. We learn also that English merchants are making a determined effort to recover their lost influence in Belgium as against their German rivals. During the first two months of 1880 Belgium imported 90,950 tons from the Ruhr basin, and 52,679 tons from England, showing a difference of 38,271 tons. In the corresponding period of 1879 the imports from the two countries were nearly equal, the difference in favour of Germany being no more than 1911 tons. There is now greater activity in the demand for English coal, and with low prices imports from England have largely increased.

The works belonging to the Felling Iron and Chemical Company, which have been closed for a long period, were partially started last week, and they will, it is expected, be got fully into operation in a few weeks. Most of the engine works and foundries in those rivers continue to be fairly employed. At Palmer's works at Jarrow there is great activity, especially in the marine engine and boiler department. At Black Hawthorn, Gateshead, large orders are on hand for locomotive and other engines and boilers, and most of the other works are well supplied with orders. At the Consett Ironworks sufficient orders are on hand to keep the works fully employed during the present year.

The iron trade has been in a very disturbed state, but the shipments of pig-iron from the Tees continue very active. For the week ending Thursday last the shipments of pig-iron amounted to 17,721 tons, and of finished iron 5363 tons, and although the make of iron has been largely increased during the past few months stocks are not increasing. In 1872 the make of crude iron in the Cleveland district was at the rate of 164,000 tons monthly, and it is now about 200,000 tons. Most of this increase is disposed of by shipment, the local and inland consumption having only increased about 3000 tons per month. On the whole, it appears that Cleveland has secured markets for the iron produced in a great number of places, and is not dependent on America or any other particular country for a market. The price of iron has gone down very considerably; the decline in merchants' prices of Cleveland during the past two months amounts to about 25s. per ton. This state of affairs can hardly continue, and makers are keeping out of the market. It is expected that fresh orders will be received from America and the Continent shortly. There is still a large delivery of steel rails, &c. Speculators have had a great deal to do with the present panic. Very low quotations are named—in some cases 37s. for No. 3. The rates for manufactured iron are also much lower—7*l.* for bars and angles, and 8*l.* for plates. The market at Middlesborough, on Tuesday, showed that a change has taken place. The downward tendency has been checked. There was during the greater part of the market more readiness to buy, and those having iron to sell held off—quotations about 38s. No. 3, and about the same for forge iron, merchants' prices. Makers' offered at 41s. stocks on warrant. Stores are less by 4036 tons on the week, Connal's holdings being 84,000 tons. The accounts from Glasgow being more favourable had a good effect at Middlesborough. The shipments of pig-iron during the week have been very heavy, large quantities having been sent to the United States. Nearly 6000 tons of manufactured iron has also been sent away, including a large lot of steel blooms for America. The Cleveland miners will be advised by their leaders to adhere to the sliding scale; in fact, it is their intent to do so, as it will be more in their favour than in that of the masters. Little fresh business appears in the manufactured iron trade, as consumers are waiting for lower prices, which they are pretty certain to get. In the foundry trade there is considerable slackness in some branches. Angles and bars are offered at about 6*l.* 10s.; ship-plates, 7*l.* 10s.; coke, 13s. to 14s. delivered in Cleveland. The North-Eastern traffic returns for the week ending Saturday again showed a very large increase—31,226*l.* over the corresponding week in 1879. The mineral traffic again yields by far the largest proportion of the week's increase—the amount being 18,516*l.* This shows clearly that the output of minerals and the manufacture of iron continue to increase rapidly.

The North of England Institnte of Mining and Mechanical Engineers general meeting will be held on Saturday, when the following papers will be read:—"On Safety Hooks," by Mr. Wm. Logan; "On Cranston's Rock Drill," communicated by Mr. Thos. Heppell.

MANUFACTURE OF IRON.—The invention of Mr. J. H. KIDD, of Wrexham, is designed to obtain a uniform quality or to vary as desired the quality of the iron to be produced, and consists in admitting or injecting cold air or air mixed with other gases into the blast furnace while it is working in the ordinary manner (and in addition to the air entering by the ordinary tuyeres) above the level of the ordinary tuyeres, this supply of air being regulated by a valve or valves and increased or diminished according to the state of the scoria or slag.

REGENERATIVE ILLUMINATION.—The system of heating illuminating gas before burning it, described in the *Mining Journal* 19 years ago, when introduced by Mr. R. H. Hughes, of the Atlas Works, Hatton Garden, is now being revived by Mr. F. Siemens, of Dresden, the arrangements in the two cases being practically identical, and the advantages the same—the ventilation of the room is improved, the consumption of gas for a given light is diminished, and the contamination of the air is altogether prevented The lamp consists of a glass globe at the end of a column descending from the roof. This column consists of three concentric tubes. The innermost tube receives the gas from a smaller tube at the top, and below another small tube gives passage for the gas to the two burners in the globe. The outer annular passage is for the entering air, which comes in at the top; the inner for the products of the flame, which, rising, find a passage to the chimney. All three separate passages are furnished with wire net, or other material, which, while presenting a large surface, allow free passage for the gas, the air, or the products of combustion, as the case may be. The flame products, rising through the inner annular passage, give up their heat to the

wire net in this space, and most so at the lower portion. The air coming down the outer passage and the gas in the middle tube receive a portion of this heat, communicated by radiation and conduction to the wire net in these passages, Thus the gas flames are maintained by highly heated gas and highly heated air. The course followed by the entering air in the globe is down along the inner surface of the globe, then up to the flames.

RUBY AND DUNDERBERG CONSOLIDATED MINING COMPANY.

The extracts which we subjoin from various authorities prove that this property has not only an English but also an American reputation. The wide manner in which these extracts are quoted in American papers devoted strictly to mining matters is a most important factor, as showing the value of the discoveries to the Richmond and Ruby district.

From the Eureka Daily Leader, dated April 5:—

DUNDERBERG.—The developments still continue, giving every promise of extent and permanency. The ore struck on the 400 ft. level opens up well. Last week the ledge was struck in the cross-cut being run on the 500 ft. level. This strike is immediately under the ore discovered a few weeks since in the 400 ft. level, and insures 100 ft. in depth of good ore. Regular ore shipments are being made to the Richmond furnaces. The developments now being made on the Dunderberg are the most important that have been made in this district in many years. It may not boom our mines to any extent in this country, but will make us remarkably solid in London, and will probably be the means of bringing in quite an amount of English capital for investment.

From the Eureka Daily Sentinel, dated April 6:—

ANOTHER STRIKE IN THE DUNDERBERG.—Strikes and developments of an important nature are coming thick and fast in this district. The latest is on the 500 ft. level of the Dunderberg. The splendid ledge cut some time ago on the 400 has now been tapped on the 500. It is found intact, and carries still higher grade ore than the development above.

From the Eureka Daily Sentinel, dated April 7:—

THE RUBY-DUNDERBERG—FURTHER INFORMATION FROM THE LATE DEVELOPMENT.—The Sentinel is informed that the late development on the 500 ft. level of the Dunderberg is even more important than was at first supposed. The ledge at this point is proven to have an average width of 14 ft., whereas it was but 10 ft. on the 400 ft. level. This shows that the lode steadily increases in size as it goes down. The ore also is said to be of better grade. There is hardly a doubt that the vein will be cut on the 600 level, showing still greater width. The find is really a portion of the old Home Ticket Mine, being some distance west of the Dunderberg lode proper. The outcrop of the Home Ticket was larger and bolder than any other on the mountain, which may be taken as an indication that immense bodies of ore will be found below. The strength and regularity of the vein encountered on the 400 level, and again on the 500, are features which give to the new development a degree of importance as establishing the permanency and value of the mine. The Ruby-Dunderberg may indeed now be classed among the great properties of this wonderfully rich district. It affords the Sentinel unbounded satisfaction to be able to chronicle these evidences of continued improvement and wealth.

These refer, as our readers will see, to the single property of the Ruby and Dunderberg Company, but the richness of the district is further demonstrated in the same papers by various other remarks on neighbouring mines. As these, however, are not so well known in London as they should be, we do not trouble our readers with further extracts. Still, to prove the value of the district generally, we call attention to the purchase by the Eureka Consolidated Mining Company of the mine known as the "K.K." An important lawsuit had existed between the two companies, and it has been wisely decided by the shareholders of each that their differences should be terminated, and their common interests merged. This has been done, and although the K.K. ground covers a comparatively small area it has been absorbed nevertheless by the Eureka Consolidated Company at the very large sum of $250,000. This fact establishes a price for local mines with which the properties of the Richmond and Ruby companies will favourably compare, comprising as these do a very extensive mining surface, which contains a distinct range of mines on the same mineral belt. The report of the Ruby Company this week is almost nominal, the day for making up the same having just been altered, as will be seen on reference to the report in another column.

The telegram likewise received by this company reports the usual steady progress for the week, and we may shortly expect to hear that stoping has been commenced in a proper mining manner. At present all the ore takings are by drivage, though these are nevertheless sufficient to more than cover current expenses. An important strike has recently been made in the Albion—a mine of this district—the company to work which was incorporated in San Francisco. A few days after this discovery about 80 tons of silver-carrying ore had been raised to the dump, and it was estimated that this would assay up to $150 per ton.

FOREIGN MINING AND METALLURGY.

The intelligence received with respect to the French Iron Trade is not discouraging upon the whole. Prices are tending downwards, but there has been no material contraction in business at present, the requirements of consumers being still considerable. Merchants' iron is quoted at 10*l.* per ton, and ordinary plates at 12*l.* per ton.

The Austrian Iron Trade also exhibits lower prices. Even steel rails and plates, which had been pretty well maintained, have given way of late. The demand has fallen off, especially for iron in bars and iron wire. The works are still well employed, but principally upon old contracts. Intending purchasers show considerable reserve, as they evidently expect that prices will go still lower. Pig has not fallen to the same proportionate extent as finished iron, but its price is maintained with difficulty. In Silesia business has been maintained better than in Westphalia; pig has been quoted at 3*l.* 4s. per ton. Rolled iron has also been sustained at 9*l.* 5s. 2d. per ton.

The exports of iron minerals from Bilbao in 1879 amounted to 1,160,248 tons. This total was made up as follows:—Exports foreign, 1,117,836 tons; coastwise, 42,412 tons. It may be added that 72,196 tons of English coal and coke were imported at Bilbao in 1879.

In the Belgian coal trade prices have been supported with difficulty, and the amount of business passing has been limited. In the Liége basin prices have almost fallen to their old level; the difference between current and former rates is a bare 2s. per ton. The French coal trade has been very quiet, but prices remain stationary. It is believed, however, that the dulness which has crept over some branches of business in France will shortly bring about lower rates, more especially as considerable supplies of foreign coal make their appearance upon the French markets. The Austrian coal trade has experienced little change; prices are maintained, but transactions are carried through with difficulty. Many contracts now in course of execution by Austrian collieries have been nearly worked out. The intelligence received with respect to the Bohemian coal trade is not very favourable.

Contracts have just been let for 2000 trucks required for the Belgian State Railways. Belgian industrials have congratulated themselves upon the fact that the Belgian tenders sent in in connection with this affair were lower than those delivered by German firms. Prices are falling more and more in the Belgian iron trade. Some houses continue to ask 7*l.* 4s. per ton for iron, but other forgemasters who are not particularly well off for orders are offering their products upon lower terms. Business could, probably, be done at 6*l.* 16s. per ton, and even at 6*l.* 8s. per ton. A cannon made by the John Cockerill Company for the Belgian Government has just sustained satisfactorily some severe tests, but the Belgian authorities continue to order cannon in Germany. The John Cockerill Company will, however, exhibit some cannon at the Brussel's industrial show.

SILVER MINING IN UTAH.—Some interesting particulars concerning the progress of the Excelsior and Utah Companies in American Fork are furnished by Mr. W. Bredemeyer to the Utah Commercial for April. He states that the Excelsior Company are working seven men on the Rustler. The main shaft is 150 ft. deep. It has been in quartzite impregnated with iron for the last 28 ft., and is expected to strike the vein at any time. The south drift stands in $67 smelting ore. The Sunday tunnel is being steadily driven forward. The Hidden Treasure has a 3-in vein of bromide of silver, which is being followed. The developments in this mine are quite extensive and promise a brilliant future for Miller Hill. The Utah Consolidated Company own five patented mines. They have resumed work. Their main tunnel has now reached a depth of 242 ft., and they have contracted to have it driven 200 ft. further. It will soon strike the celebrated Queen of the West vein, now embraced in the La Belle and Meacoque patents. The vein here shows 5 ft. of $60 ore on the surface. The tunnel will tap the ledge in Miller Hill at a depth of 300 to 2000 ft. The Wild Dutchman is being worked as profitably as ever. The Pittsburg ships 15 tons of good ore per day, and has some thousands of ore in sight. As they go down on it and into the mountain the proportion of rich chlorides increases. Messrs. Morgan, Hanauer, and Heinze have a very valuable mine in the Pittsburg and War Eagle B Mines. They are cross locations, both patented. The Silver Bell and Austin will resume work shortly. Mr. Pierce is working six men in Deer Creek, and shipping $75 ore. The snow is rapidly going off. American Fork District bids fair to be the scene of more activity the coming season than in its old and palmy days.

EXPERIMENTS WITH EXPLOSIVE SUBSTANCES.

Prof. F. A. Abel, C.B., F.R.S., chemist to the War Department, conducted a series of interesting and remarkable experiments on the proof grounds in the Government marshes adjoining the Royal Arsenal, Woolwich, on Wednesday, in the presence of many spectators, including a number of officers and cadets of the Royal Navy. Major-General C. W. Younghusband, C.B., Royal Artillery, President of the Explosives Committee; Col. C. H. Owen, Department of Director of Artillery; Col. Inglis, Royal Engineers, and other members of the Ordnance Select Committee, and Major Majendie, Royal Artillery, Her Majesty's Inspector of Explosions, were also present. Prof. Abel began by explaining that the violence of action of an explosive substance is regulated by the resistance opposed to the escape of the gases at the instant of first ignition; and, furthermore, that the partial confinement of the disengaged gases by the mass of the explosive alone is sufficient to develope violent explosion. These examples he proceeded to illustrate by the first series of experiments, showing that gunpowder, and even so powerful an agent as mercurial fulminate, when ignited on the surface, produced a mild report in comparison with the result of similar charges ignited at the base of the heap. The next experiments were devoted to an exposition of the theory of detonation, the development of which, the Professor said, was dependent upon the nature, quantity, and confinement of the detonator in relation to the nature and mechanical condition of the substance to be detonated. Thus 25 grains of mercurial fulminate exploded unconfined upon a mass of dynamite left the latter unimpaired, whereas only 1 grain of fulminate strongly confined produced detonation and the dynamite was thereby exploded. Similar experiments were tried with corresponding results with guncotton, loose and compressed, and other compounds, and then Prof. Abel, having laid down the axiom that rigidity of the mass is essential to detonation, proved further that the facility and completeness with which detonation is transmitted from particle to particle of a mass of explosive material is regulated by the rigidity in the resistance to mechanical motion which the particles offer. The most perfect explosive agent known to modern science was nitro-glycerine, employed through the medium of some suitable absorbent, one of the best of which was collodion guncotton, as used by photographers. A new compound of nitro-glycerine and an absorbent had recently been produced under the name of blasting gelatine, and this was pronounced to be the most violent explosive known to science. This gelatine, however, dispersed with litte effect when fired in its ordinary state; but when solidified by freezing, which was easily accomplished, it destroyed the iron plate upon which it stood. The difference between explosion and detonation was next lucidly demonstrated. An open case containing 5 lbs. of powder was placed upon an iron plate and exploded, but the plate was scarcely damaged; a similar quantity of guncotton suspended 4 ft. above the plate, however, completely crushed it, consequent upon the greater violence of the detonation and the suddenness of its development and transmission. The practical application of this rapid violence was displayed by the destruction of a bronze cannon by filling it with water and detonating therein a mere morsel of guncotton. Various peculiar qualities of guncotton were illustrated by successive experiments, and its power of transmitting detonation from one mass to another, as well as its rending capacity as distinguished from mere displacement, were evidenced in a startling manner by the destruction of a strongly-constructed stockade of heavy balks of timber, the tops of which were cut off level with the ground and thrown to a considerable distance. Other experiments followed, in which the efficiency and convenience of wet guncotton were exemplified; and, in conclusion, a charge was detonated under water, throwing up a pyramid of spray to a great height. Mr. Brown, assistant to Prof. Abel, arranged the charges and fired them by electricity, and instantaneous photographs of the most remarkable displays were taken by the photograhers from the Chemical Department of the Royal Arsenal.

INSTITUTION OF MECHANICAL ENGINEERS.

The second meeting of this Institution was held on Friday evening, under the presidency of Mr. EDWARD A. COWPER. In the course of a brief discussion on a paper communicated by Mr. WM. ANDERSON, of Erith, respecting Chernoff's experiments on steel, the Chairman stated that many years ago at the Bank of England Mr. Barton made some steel buttons and ruled extremely fine lines with a diamond on the surface. The lines made the most beautiful prismatic colours, like those in mother-of-pearl. He had also in his possession a sample of glass ruled in the same way with very fine lines, which gave perfect prismatic colours. The lines were about 6000 to the inch.

Mr. J. ROBINSON asked for further information concerning the following statement in the paper:—"Tables of experiments are cited to show that with proper annealing, in conformity with the principles laid down in 1868, cast-steel is fully as tough, tenacious, and ductile as the forged metal." The members of the Institution would like to have an explanation of that statement, which was not in accordance with their experience.

Mr. ANDERSON said the enormous difficulty of the whole subject grew upon him the more he directed his attention to it. The tables referred to by Mr. Robinson would be found in the English translation of M. D. Chernoff's paper, read in December, 1878, before the Imperial Russian Technical Society. They showed that the ultimate strength of forged steel, containing about ¼ per cent of manganese and a trace of silicon, was from 22 to 46 tons per square inch; the strength of the same, after annealing in oil, was from 22 to 66 tons. The strength of cast-steel not forged was from 27 to 40 tons; and the strength of the same, after annealing in oil and tempering, was from 32 to 51 tons.

Mr. J. ROBINSON enquired whether all the specimens were subjected to tensile strains?

Mr. ANDERSON replied in the affirmative. He confessed his own impression, derived from experience many years ago, was that steel castings were not many degrees removed from cast-iron in regard to brittleness. Still every year great improvements were made in the casting of steel, and therefore he had no doubt that these observations of Chernoff were perfectly right.

Prof. Hughes, Mr. Smith, Mr. Fernie, Mr. Paget, Mr. Beaumont, Mr. Head, and Mr. Jabez James also joined in the discussion.

Mr. HENRY DAVEY, of Leeds, next communicated a paper "On Water-pressure Engines for Mining Purposes." He described in minute detail two engines of this kind, which although they were of very limited application, presented several points of interest, particularly as in the application of water-power engineers were often called upon to devise special means in order to meet special contingencies. The question of applying hydraulic power economically to varying resistances had received considerable attention. A very clever and ingenious device, that of automatically altering the stroke by means of a resistance governor, had been recently described in a paper before that Institution. There were other methods which readily suggested themselves, such as levers having shifting fulcrums, and similar devices; but the author had never found any such mechanism sufficiently practical for general application. A dip-engine, which was fully described in the paper, might be provided with a lever having a shifting fulcrum, betweeen the power-cylinder and the pump; but the economy so gained beyond that effected by the loose liner and change of piston would not compensate for the extra complication. In rotary engines having fly-wheels, the admission valves of the power cylinders might be made to close at varying points in the stroke by means of known mechanisms; and if the ends of the cylinders were provided with vacuum valves opening inwards, from pipes dipping into a waste-water cistern, the speed of the engine might be kept constant, while the supply of pressure water was varied to meet the varying resistance to which the engine might be applied. The cylinder would be partly filled from the pressure pipe, and then the remaining space would be automatically filled from the waste tank. By the use of three double-acting cylinders working on one crank-shaft, the portion of the stroke during which the pressure water would be admitted might be considerably varied, without causing a great fluctuation in the velocity of the driving column. Notwithstanding the great progress which had been made in the employment of water-pressure engines, the author was of opinion that there was a wide field still open for their further application, and for the exercise of ingenuity in the perfecting of details and in securing greater efficiency. It was mainly with a view of directing attention to a power which was somewhat neglected in this age of steam that he had been prompted to bring forward this subject for discussion.

Dr. J. HOPKINSON, F.R.S., in a paper "On Electric Lighting," remarked that since the date of the author's former communication on this subject, in April, 1879, other observers had published the results of experiments similar to those described by him. He, therefore, now exhibited some of those results reduced to the form he had adopted—a curve such as that shown in the Proceedings of the Institution for 1879, and reproduced, with slight alterations, in the diagrams exhibited last evening. He pointed out that the success of burning more than one regulating lamp in series depended on the use in the regulator of an electro-magnet, excited by a high-resistance wire connecting the two opposed carbons. The force of this magnet would depend upon the difference of potential in the arc, instead of depending, as in the ordinary lamp, upon the current passing. Such a shunt magnet had been employed in a variety of ways. The author had arranged it as an attachment to an ordinary regulator; the shunt magnet actuated a key, which short-circuited the magnet of the lamp when the carbons were too far parted, and so caused them to close. In conclusion, the author reminded engineers of the following rule for determining the efficiency of any system of electric lighting in which the electric arc was used, the arc being neither exceptionally long nor exceptionally short:—Measure the difference of potential of the arc, and also the current passing through it, in volts and webers respectively: then the product of these quantities, divided by 746, was the horse-power developed in that arc. I was then known that the difference between the horse-power developed in the arc and the horse-power expended to drive the machine must be absolutely wasted, and had been expended in heating either the iron of the machine or the copper conducting wires. Votes of thanks were awa to the authors of the papers which had been read.

The CHAIRMAN moved a vote of thanks to the Institution of Engineers for their kindness in granting the use of their rooms the present meeting Th was carried by acclamation, and the ceedings terminated.

NEW FRICTION CLUTCH.—On the axis of a wheel or pulley to be operated by the clutch or to be stopped by brake friction, Mr. E. HENNEQUIN, of Paris, proposes to fit a boss having its circumference shaped as two eccentric or volute segments fitting respectively the interior surfaces of two loose segments that lie in a recess between the boss and a projecting rim or flange of the wheel or pulley, and that have their outer circumferences of cylindrical form fitting the interior surface of the said rim. A handle is provided by which the boss can be turned in the one direction or the other, and in the two spaces between the loose segments are placed springs. On turning the boss in the one direction its eccentric segments exert a wedge-like action, forcing outwards the loose segments and causing them to press against the interior of the rim of the wheel or pulley, which is thus by the frictional hold of the segments on it caused to revolve with the axis when the axis rotates, or which is retarded or stopped if the axis be at rest.

EPPS'S COCOA—GRATEFUL AND COMFORTING.—"By a thorough knowledge of the natural laws which govern the operations of digestion and nutrition, and by a careful application of the fine properties of well-selected cocoa, Mr. Epps has provided our breakfast tables with a delicately flavoured beverage which may save us many heavy doctors' bills. It is by the judicious use of such articles of diet that a constitution may be gradually built up until strong enough to resist every tendency to disease. Hundreds of subtle maladies are floating around us ready to attack wherever there is a weak point. We may escape many a fatal shaft by keeping ourselves well fortified with pure blood and a properly nourished frame."—*Civil Service Gazette.*—Sold only in packets labelled—"JAMES EPPS and Co., Homœopathic Chemists, London."

HOLLOWAY'S OINTMENT AND PILLS—RHEUMATISM AND GOUT.—These purifying and soothing remedies demand the earnest attention of all persons liable to gout, sciatica, or other painful affections of the muscles, nerves, or joints. The ointment should be applied after the affected parts have been patiently fomented with warm water, when the unguent should be diligently rubbed upon the adjacent skin, unless the friction should cause pain. Holloway's pills should be simultaneously taken to reduce inflammation and to purify the blood. This treatment abates the violence, and lessens the frequency of gout, rheumatism, and all spasmodic diseases, which spring from hereditary predisposition, or from any accidental weakness of constitution. This ointment checks the local remedy. The pills restore the vital powers.

JOSEPH FIRTH AND SONS'
New Patent Brick-making Machine

Embraces the following advantages—viz.:

Simplicity, strength, and durability. Compactness and excellence of mechanica arrangements, large producing capabilities, moderate cost.

It makes two bricks at once, and will make 12,000 to 14,000 plastic pressed bricks per day, hard enough to go direct to the kiln without drying; or it will make the bricks thoroughly plastic if required. For works requiring a machine at less cost the machine is made to turn out one brick at once, and is capable of producing 8000 bricks per day.

The Machine can be seen at work daily at the Brickworks of the Patentees, JOSEPH FIRTH AND SONS, WEBSTER HILL, DEWSBURY, as also their Patent Gas Kiln for Burning Bricks, which possesses the following amongst other advantages, viz.:—Economy in Fuel, Rapidity and Quality of Work, even Distribution of Heat, and Total Consumption of Smoke.

[*See Illustrated Advertisement every alternate week.*]

SOLID DRAWN BRASS AND COPPER BOILER TUBES,

FOR LOCOMOTIVE OR MARINE BOILERS,
EITHER
MUNTZ'S OR GREEN'S PROCESS.

MUNTZ'S METAL COMPANY (LIMITED),
FRENCH WALLS,
NEAR BIRMINGHAM.

FRANCIS AND JENKINS,
GREENFIELD WORKS,
LLANELLY, S. WALES,
MANUFACTURERS OF THE
Improved Solid Steel Shovels, C. S. Forks, Solid Steel Miners' Shovels, Railway and Miners' Picks,
Steel-pointed Spades and Shovels, Draining and Grafting Tools, &c.
ALSO MANUFACTURERS OF
COPPER WORKS' LADLES,
To which special attention is given.
RABBLE HEADS, PADDLES, AND EVERY DESCRIPTION OF GHT HAMMERED WORK.

HADFIELD'S STEEL FOUNDRY COMPANY

AWARDED THE FIRST-CLASS PRIZE,

SYDNEY EXHIBITION, 1880.

AWARDED THE ONLY GOLD MEDAL AT PARIS EXHIBITION, 1878, FOR CRUCIBLE STEEL CASTINGS. FIRST PRIZE MEDALS AT LEEDS, WREXHAM, AND MANCHESTER EXHIBITIONS, 1875 AND 1876. AND THE HIGHEST AWARD FROM THE MINING INSTITUTE OF CORNWALL, 1878.

ATTERCLIFFE, SHEFFIELD,

MANUFACTURERS EXCLUSIVELY OF

Crucible and Cast Steel Castings,

FOR

Engineering & Mining Purposes,

AND ARE THE SOLE MAKERS OF

AWARDED THE FIRST-CLASS PRIZE,

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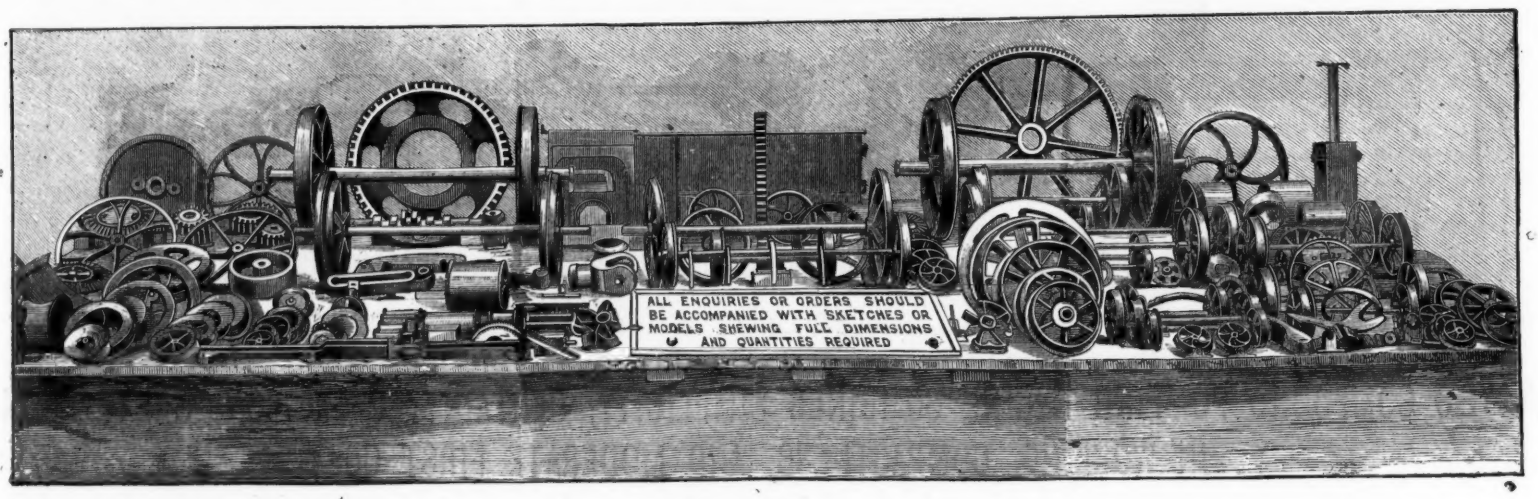
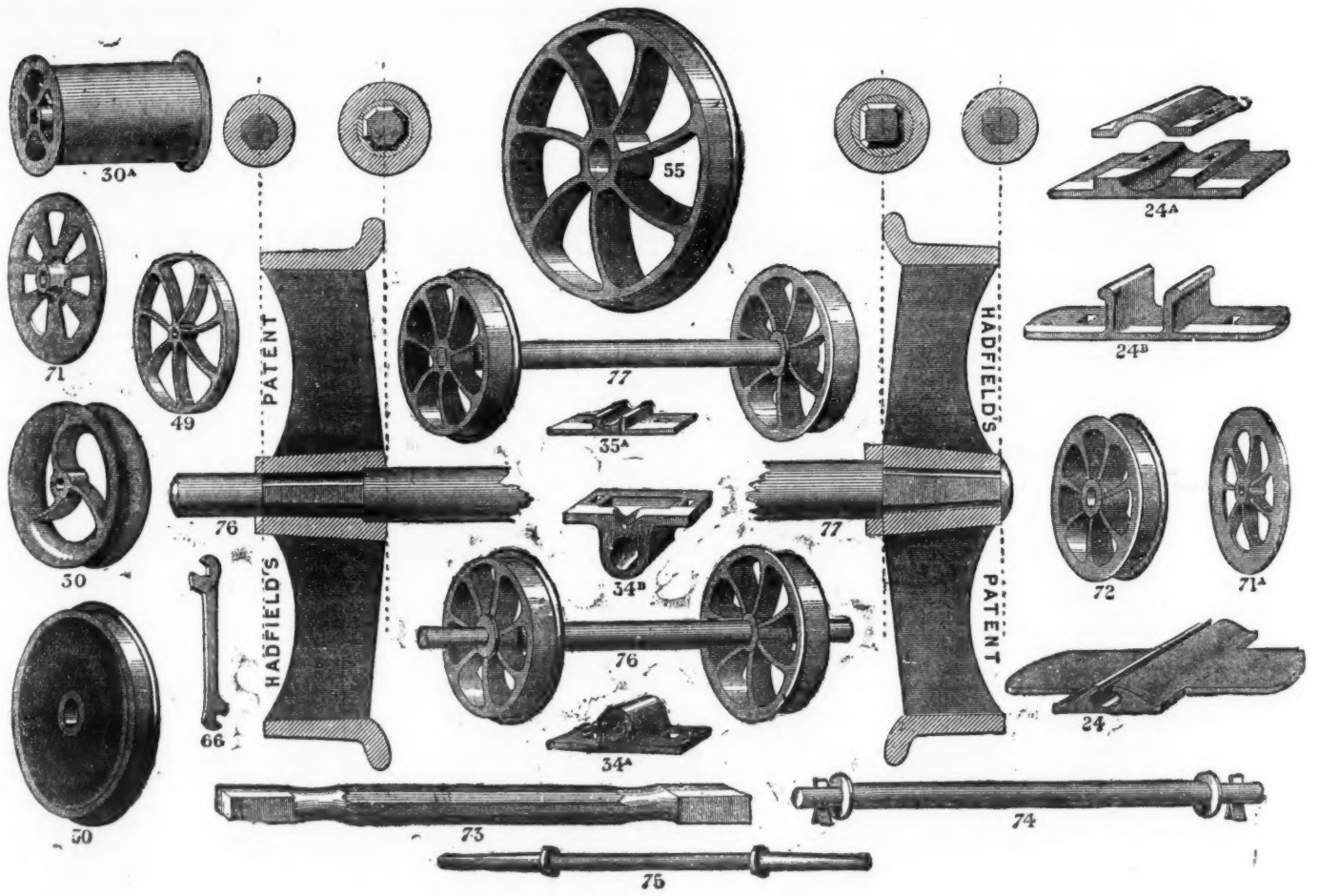
HADFIELD'S CAST STEEL WHEELS.

One of our departments is specially adapted for the manufacture of these Wheels (as shown below), for Collieries, Ironstone Mines, Slate Quarries, Ironworks, Lead Mines, &c., &c. We have made, and are now making, many HUNDRED THOUSANDS; and having Patented a New Method of Fitting Wheels upon axles, being cheap, effective, and expeditious, we can execute orders entrusted to us with promptitude, our capacity in this department alone being equal to about 2000 wheels per week.


ALL ENQUIRIES OR ORDERS SHOULD BE ACCOMPANIED WITH SKETCHES OR MODELS SHEWING FULL DIMENSIONS AND QUANTITIES REQUIRED

N.B.—Prices per Set of Wheels and Axles, fitted complete, forwarded on receipt of diameter of wheel on tread, depth of tread, real gauge, and thickness of axles and rolling load.



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HADFIELD'S PATENT METHOD OF FITTING WHEELS UPON AXLES.

The advantages of the above system are that the Wheels being forced upon a Taper Square-ended Axle, by Machinery, and then riveted (the machine securing truth), it is impossible that they can come loose or get within gauge. They are very cheaply fitted on, and run exceedingly true.

We construct the Arms of wheels upon the curved principle (as shown in the drawings above), consequently the shrinkage or cooling of the Castings is not interfered with, thus securing the greatest advantages of our very strong material.

CRUCIBLE CAST-STEEL WHEELS, when cast by us, are made from one-third to one-half lighter than Cast-Iron. They cannot be broken while working, even with rough usage and will wear at least twelve times as long as Cast-Iron, thus saving animal and steam power, and reducing wear and tear immensely.

We would also draw special attention to our INCLINE PULLEYS and CAGE GUIDES, the adoption of which will prove highly advantageous.

MACHINE MOULDED STEEL GEAR WHEELS OF EVERY DESCRIPTION.

PARIS EXHIBITION, 1878.

GOLD AND SILVER MEDALS AWARDED for Steam-Engines & Boilers, also the Special Steam Pump, and Compound Pumping Engine.

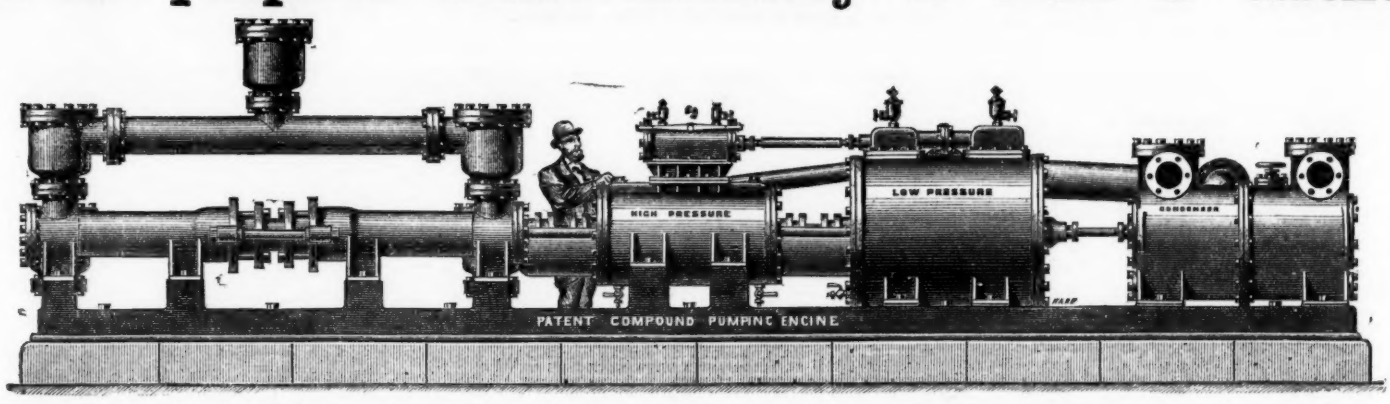
TANGYE BROTHERS AND HOLMAN,

CORNWALL HOUSE, 35, QUEEN VICTORIA STREET, LONDON, E.C.,
AND BIRMINGHAM, (TANGYE BROTHERS), CORNWALL WORKS, SOHO.

TANGYE'S DIRECT-ACTING
COMPOUND PUMPING ENGINE,

For use in Mines, Water Works, Sewage Works,

And all purposes where Economy of Fuel is essential.



TANGYE'S DIRECT-ACTING COMPOUND PUMPING ENGINE, WITH AIR-PUMP CONDENSER.

TANGYE'S COMPOUND PUMPING ENGINE COMBINES SIMPLICITY, CERTAINTY OF ACTION, GREAT ECONOMY IN WORKING, COMPACTNESS, AND MODERATE FIRST COST.

This Engine will be found the most simple and economical appliance for Mine Draining, Town Water Supply, and General Purposes of Pumping ever introduced, and as regards Mine Draining, the first cost is very moderate compared with the method of raising water from great depths by a series of 40 or 50 fm. lifts. No costly engine-houses or massive foundations, no repetition of plunger lifts, ponderous connecting rods, or complication of pitwork, are required, while they allow a clear shaft for hauling purposes. In this Engine the economical advantages resulting from the expansion and condensation of steam are very simply and effectively obtained. The steam after leaving the high-pressure cylinder is received into and expanded in the low-pressure cylinder, and is thus used twice over before being exhausted into the condenser or atmosphere.

The following first-class Testimonials will bear evidence as to the efficiency and economy of the Engine :—

TESTIMONIALS OF TANGYE'S COMPOUND PUMPING ENGINE.

$\frac{21"}{36}$ × 10" × 48" COMPOUND CONDENSING STEAM PUMPING ENGINE.
Newcastle and Gateshead Water Company, Newcastle-on-Tyne, Oct. 20, 1879.
Messrs. Tangye Brothers.

GENTLEMEN,—In reply to your enquiry as to the efficiency of the two pairs of Compound Condensing Engines recently erected by you for this company at our Gateshead Pumping Station, I have great pleasure in informing you that they have far surpassed my expectations, being capable of pumping 50 per cent. more water than the quantity contracted for; and by a series of experiments I find they work as economically as any other engine of the compound type, and will compare favourably with any other class of pumping engine. By the simplicity of their arrangement and superior workmanship they require very little attendance and repairs, and the pumps are quite noiseless. A short time ago I had them tried upon air by suddenly shutting off the column, and found they did not run away, thus showing the perfect controlling or governing power of the Floyd's Improved Steam-moved Reversing Vale. I will thank you to forward the other two pairs you have in hand for our Benwell Pumping Station.

Yours respectfully,
(Signed) JOHN R. FORSTER, Engineer.

$\frac{21"}{36}$ × 12" × 48" DOUBLE RAM COMPOUND CONDENSING STEAM PUMPING ENGINES.
The Chesterfield and Boythorpe Colliery Company (Limited),
Registered Office, Boythorpe, near Chesterfield, Oct. 1, 1879.
Messrs. Tangye Brothers. Supplied in January, 1878.

GENTLEMEN,—Referring to the above, which we have now had working continuously night and day for the last 12 months, we are glad to say that it is giving us every satisfaction. It is fixed about 400 feet below the surface, the steam being taken down to it at pressure of 45 lbs. per square inch. We can work the pump without any difficulty at 28 strokes per minute=224 ft. piston speed. The pumping power is enormous. The vacuum in the condenser being from 11½ to 13 lbs. The pump is easily started, and works well and regularly. The amount of steam taken being much less than we anticipated. We consider the economy in working very satisfactory indeed. The desire for power and economy at the present day will certainly bring this pump into great requisition.

Yours truly,
(Signed) M. STRAW, Manager.

SIZES AND PARTICULARS.

Diameter of High-pressure Cylinder.....In.		8	8	8	10	10	10	10	12	12	12	12	14	14	14	14
Ditto of Low-pressure Cylinder .....In.		14	14	14	18	18	18	18	21	21	21	21	24	24	24	24
Ditto of Water Cylinder .....In.		4	5	6	5	6	7	8	6	7	8	10	7	8	10	12
Length of stroke .....In.		24	24	24	24	24	24	24	24	24	24	24	36	36	36	36
Gallons per hour approximate		3900	6100	8800	6100	8800	12,000	15,650	8,800	12,000	15,650	24,450	12,000	15,650	24,450	35,225
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder	Non-condensing...	360	330	160	360	250	184	140	360	264	202	130	360	275	175	122
Ditto ditto	ditto—with Holman's Condenser...	480	307	213	480	333	245	187	480	352	269	173	480	367	234	162
Ditto ditto	ditto—with Air-pump Condenser...	600	384	267	600	417	306	335	600	440	337	216	600	459	293	203

CONTINUED.

Diameter of High-pressure Cylinder .....In.		16	16	16	16	18	18	18	18	21	21	21	24	24	24	30	30
Ditto of Low-pressure Cylinder .....In.		28	28	28	28	32	32	32	32	36	36	36	42	42	42	52	52
Ditto of Water Cylinder .....In.		8	10	12	14	8	10	12	14	10	12	14	10	12	14	12	14
Length of stroke .....In.		36	36	36	36	48	48	48	48	48	48	48	48	48	48	48	48
Gallons per hour approximate		15,650	24,450	35,225	47,950	13,650	24,450	35,225	47,950	24,450	35,225	47,950	24,450	35,225	47,050	35,225	47,950
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder	Non-condensing..	360	230	160	118	456	292	202	149	397	276	202	518	360	264	562	
Ditto ditto	ditto—with Holman's Condenser...	480	307	213	154	603	389	269	198	528	363	269	691	480	352	750	
Ditto ditto	ditto—with Air-pump Condenser...	600	384	267	191	750	486	337	248	660	450	337	864	600	440	937	

PRICES GIVEN ON RECEIPT OF REQUIREMENTS.

Any number of these Engines can be placed side by side, to work in conjunction or separately as desired, thereby multiplying the work of one Pump to any extent.

NORTHERN DEPOT:—TANGYE BROTHERS, ST. NICHOLAS BUILDINGS, NEWCASTLE-ON-TYNE.

TWO GOLD MEDALS.

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CORRUGATED FURNACE FLUES,

NOW APPLIED TO OVER

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PARIS, 1878.

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Leeds, Yorkshire.

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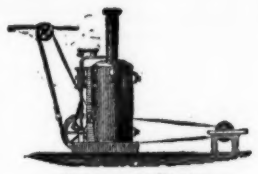
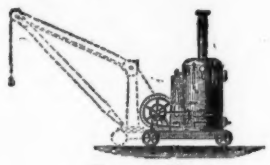
CHAPLIN'S PATENT PORTABLE STEAM ENGINES AND BOILERS.

(PRIZE MEDAL, INTERNATIONAL EXHIBITION.)

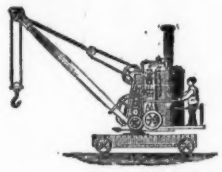
ALWAYS IN STOCK OR IN PROGRESS.



STATIONARY ENGINE.
From 1 to 30 horse-power.
No building required.

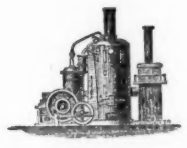


PORTABLE HOIST.
1 to 30 horse-power.
With or without Jib.

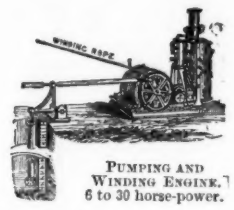


STEAM CRANE.*
15 cwts. to 20 tons.
For Wharf or Rail.

CONTRACTORS' LOCOMOTIVE.
9 to 27 horse-power.
For Steep Inclines and Quick Curves.



SHIPS' ENGINE.
For Winding, Cooking, and Distilling.
Sanctioned by H.M. Government.



PUMPING AND WINDING ENGINE.
6 to 30 horse-power.

* These cranes were selected by H.M. Commissioners to receive and send away the heavy machinery in the International Exhibitions 1862, 1871, and 1872.

Chaplin's Patent Improved Steam Excavator or "Navvy."
Steam and Hand Derrick and Overhead Travelling Cranes.

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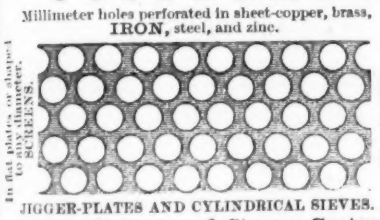
Established 1848. Samples and prices on receipt of specification.

Millimeter holes perforated in sheet-copper, brass, IRON, steel, and zinc.



In flat plates or sheet for screens.

GRATINGS.

JIGGER-PLATES AND CYLINDRICAL SIEVES.

CERTIFICATE OF MERIT
Awarded by the Mining Institute of Cornwall for SIEVES AND GRATES, Shown at the Annual Exhibition, 1879.

Lineal holes per inch woven in copper, brass, iron, and steel wire.

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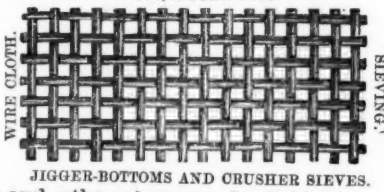

Strong web, the cross wires equally bent. SIEVING.

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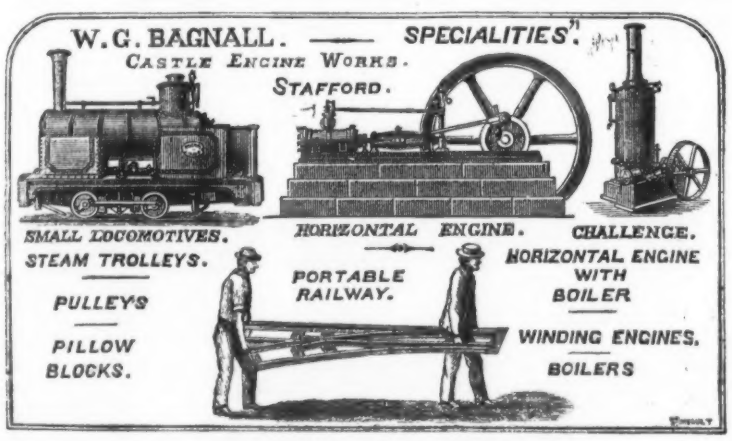

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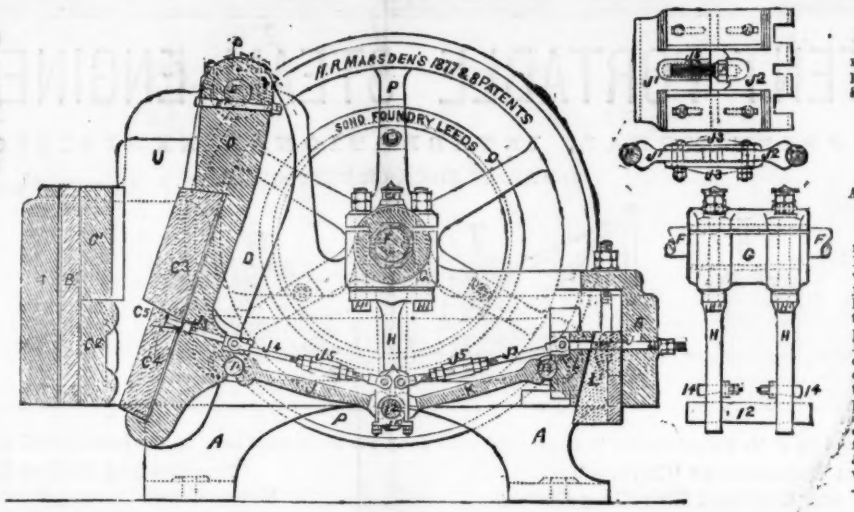

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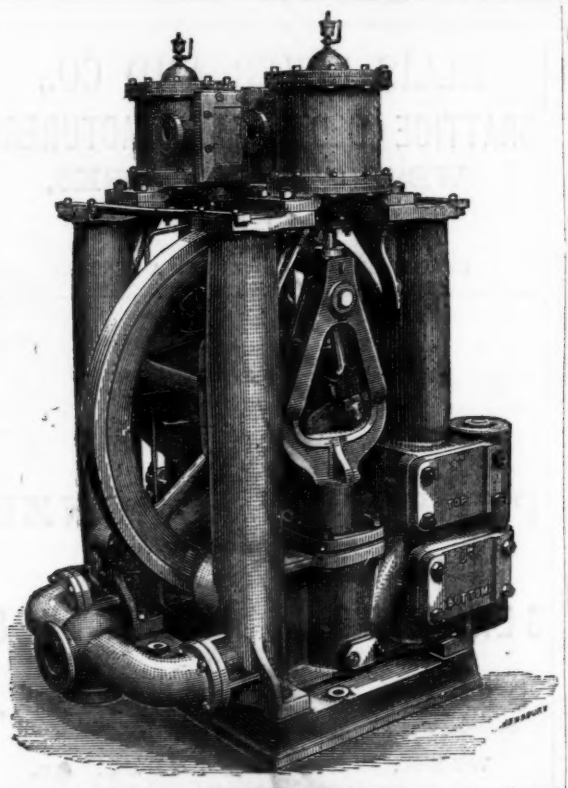

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